5513

Walk Around

Allison Engined Mustangs

Walk Around Number 13

squadron/signal publications

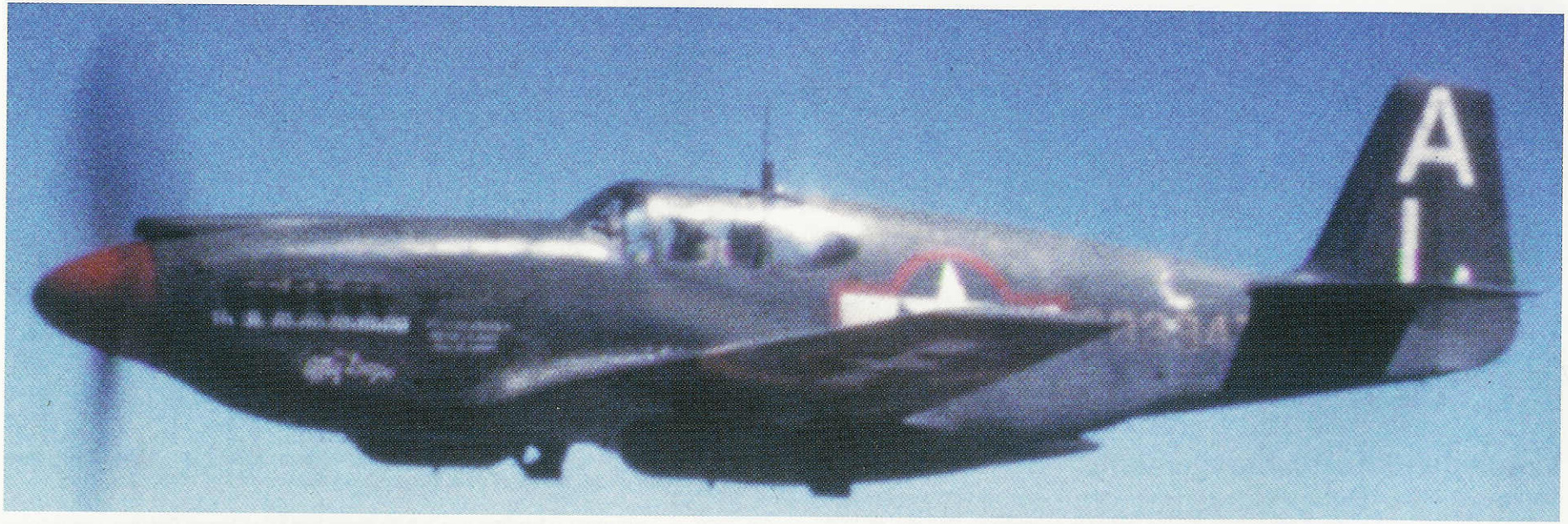
Walk Around

Allison Engined Mustangs

By Glen Phillips

Color by Don Greer

Illustrated by Don Greer and David Smith



Walk Around Number 13

squadron/signal publications

The Early Mustangs

Bright blue skies and fluffy white clouds. In the distance, thick white contrails stream behind formations of heavy bombers. Above, around, and to the front, smaller contrails are etched against the sky in a gently weaving pattern. At the front of each trail, are small silvery fighters, each suddenly shedding a pair of drop tanks and pulling around in a hard diving turn. The song of the Merlin and the rattle of machine gun fire and another Luftwaffe fighter begins its long smoking descent to the fields of Germany 25,000 feet below. One more that won't get to the bombers...

Mention the P-51 Mustang to any World War II buff and that, or a similar image, is what comes to mind. It wasn't always that way. The Mustang started life as a private venture — some might say gamble — on the part of the fledgling North American Aviation Company to build a fighter for Britain's Royal Air Force. The RAF wanted North American to license build Curtiss P-40s, however, company president James H. "Dutch" Kindelberger convinced the British Purchasing Commission that he could build a fighter that was faster, more maneuverable, and could fly farther than the P-40 while using the same engine. It was a tall order. Using data purchased from Curtiss and NACA, the North American design and construction teams worked around the clock. Some 120 days later, the NA-73X airframe was rolled out in September of 1940. Although lacking an engine, and being rolled out on borrowed wheels, the new ship looked every inch the fighter it promised to be.

Powered by an Allison engine, the first RAF machine rolled off the assembly line in mid-April 1941. The first RAF combat mission took place in May of 1942. The Mustang started it's combat life, not as a high altitude fighter, but as a low level reconnaissance and Army Cooperation aircraft. The Allison engine simply lacked power at higher altitudes — altitudes above 20,000. The problem was not so much with the engine as it was with the simple single stage supercharger.

Through 1942 and into 1943, the Allison-powered Mustangs evolved into a potent dive bomber, reconnaissance, and ground attack aircraft. At lower altitudes, they could hold their own and then some against enemy fighters, including the Luftwaffe's vaunted Focke Wulf Fw190. Almost 1600 Allison engined Mustang I, P-51, A-36, and P-51A aircraft were built. Their homes ranged from the mud and fog of an English country airfield, to the blazing sands of North Africa, to the hot and humid sub-tropics of India and Burma.

Silvery? Not these aircraft. Despite their clean lines and racing plane looks, their world was down low where they used dull greens, browns, and grays to blend in with the terrain. Often at the end of the supply line, their drab, patchy, and faded colors were streaked with fluids and exhaust stains. The early Mustang and its Allison engine was a worker. Hard, dirty, and sweat stained, this was its world.

It was Cinderella — Before the ball...

Credits and Acknowledgements

The assistance of the following individuals and organizations is gratefully acknowledged: Rebecca Phillips; Larry Davis; Experimental Aircraft Association Museum: Tom Barrett, John Hopkins, Joan Mueller, Dennis Parks; Modeldecal: Richard L. Ward; San Diego Aerospace Museum: Ray Wagner; Scale Aircraft Modelling: Alan Hall, Andy Shepard; USAF Museum: Roger Deere, Rick Dodd, Dave Menard, Bob Spaulding, Chuck Weyrauch, Marty Whetsone; Yanks Air Museum: Dave Gallup, Stan Hoefler, Ingo Moos; and finally: Jeff Ethell, who helped a fledgling author get this book off the ground.

All photos by the author unless credited otherwise.

COPYRIGHT 1998 SQUADRON/SIGNAL PUBLICATIONS, INC.
1115 CROWLEY DRIVE CARROLLTON, TEXAS 75011-5010
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form by means electrical, mechanical or otherwise, without written permission of the publisher.

ISBN 0-89747-386-8

If you have any photographs of aircraft, armor, soldiers or ships of any nation, particularly wartime snapshots, why not share them with us and help make Squadron/Signal's books all the more interesting and complete in the future. Any photograph sent to us will be copied and the original returned. The donor will be fully credited for any photos used. Please send them to:

Squadron/Signal Publications, Inc.
1115 Crowley Drive
Carrollton, TX 75011-5010

Если у вас есть фотографии самолётов, вооружения, солдат или кораблей любой страны, особенно, снимки времён войны, поделитесь с нами и помогите сделать новые книги издательства Эскадрон/Сигнал ещё интереснее. Мы переснимем ваши фотографии и вернём оригиналы. Имена приславших снимки будут сопровождать все опубликованные фотографии. Пожалуйста, присылайте фотографии по адресу:

Squadron/Signal Publications, Inc.
1115 Crowley Drive
Carrollton, TX 75011-5010

軍用機、装甲車両、兵士、軍艦などの写真を所持しておられる方はいらっしゃいませんか？どの国のものでも結構です。作戦中に撮影されたものが特に良いのです。Squadron/Signal社の出版する刊行物において、このような写真は内容を一層充実し、興味深くすることができます。当方にお送り頂いた写真は、複写の後お返しいたします。出版物中に写真を使用した場合は、必ず提供者のお名前を明記させて頂きます。お写真は下記にご送付ください。

Squadron/Signal Publications, Inc.
1115 Crowley Drive
Carrollton, TX 75011-5010

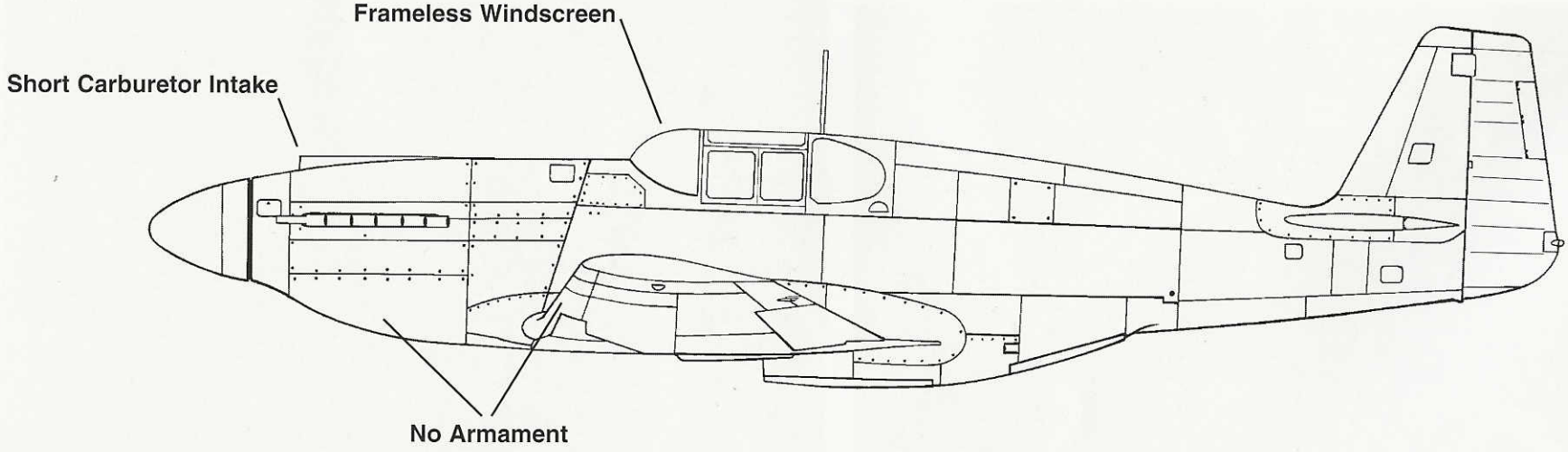
(Photo Previous page) Bombed up and looking for targets, an A-36 of the 27th Fighter Bomber Group prowls the skies over Sicily during the summer of 1943.

(Front Cover) RICHFIELD ROWDY was a P-51 flown by Lt Col James Deering, commander of the 154th Observation Group in North Africa in 1943

(Back Cover) Flying Officer Hollis Hills of 414 Squadron, RCAF scored the first Mustang kill of WW II when he shot down an Fw 190 over Dieppe on 19 August 1942. F/O Hills was a US citizen and later joined the US Navy. He scored four more kills while flying F6F Hellcats for VF-32 in the Pacific.

AG346 was the second production machine built for the RAF and the first to actually go to the UK. It is equipped with the short carburetor intake and small triangular plates over the wheel hubs. The short carburetor intake didn't last much beyond the first few airframes. (EAAM)

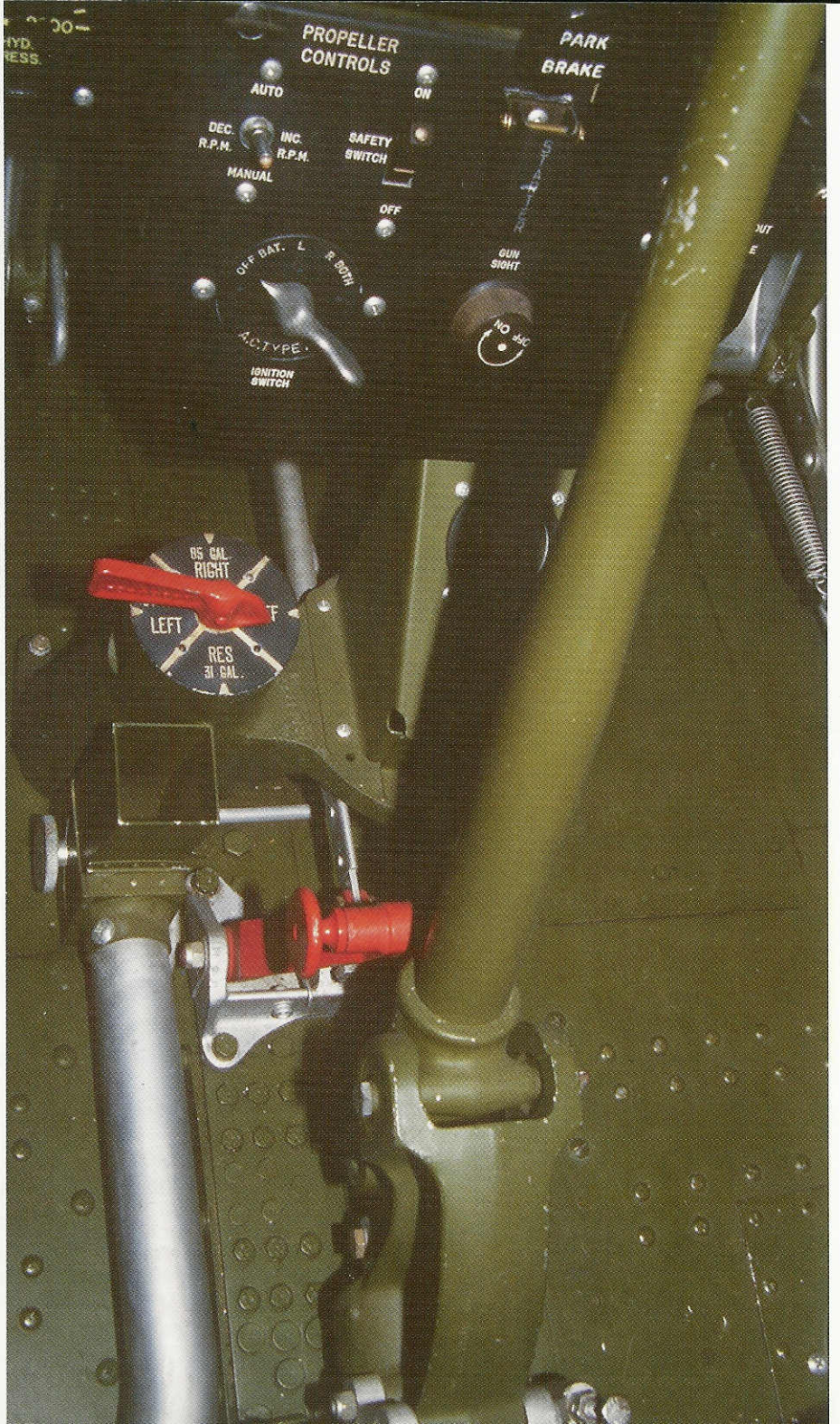
NA-73X

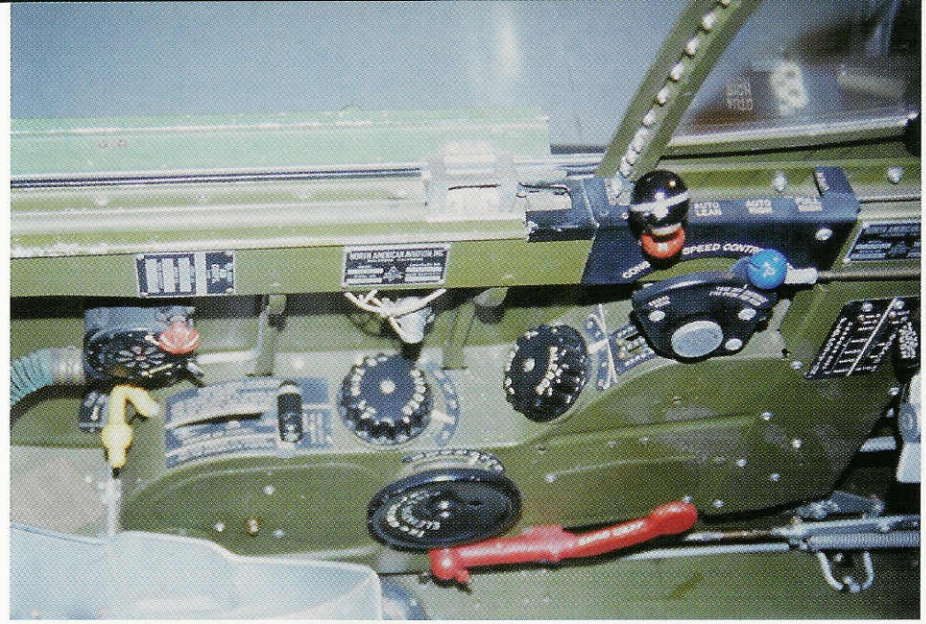


(Above)The cockpit had a conventional layout: primary flight and engine instruments on the front panel, engine, prop, and mixture controls on the left side, with radio and electrical systems panels on the right.

(Right) The center floor area housed the cold air vent, fuel selector control valve and a crutch and pin to lock the stick. The base of the stick was usually covered with a leather or canvas boot.

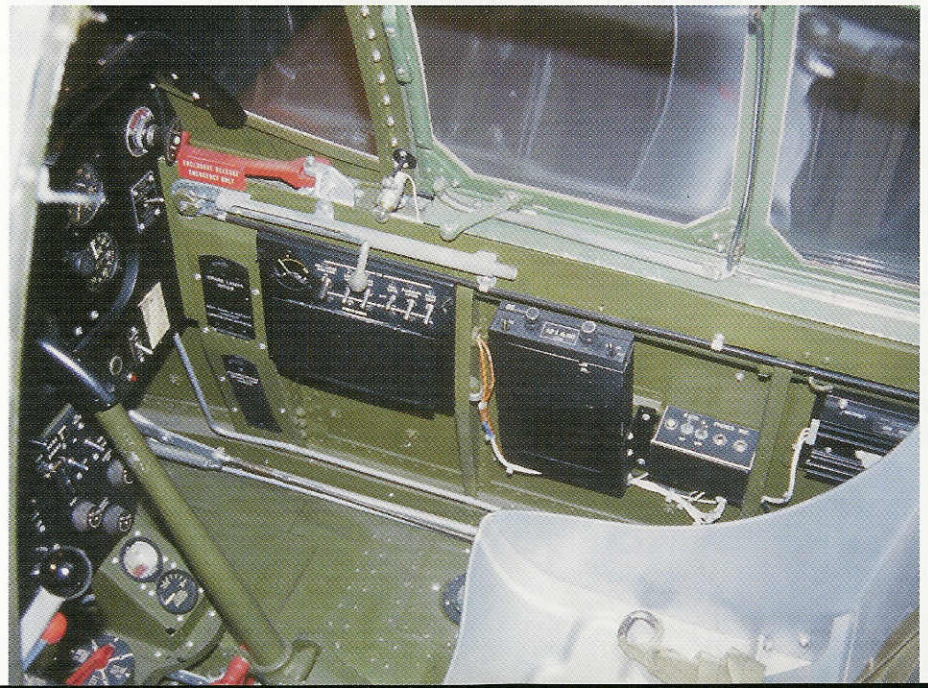
(Below) The floor of the cockpit was the upper surface of the wing center section. RAF Mustang I interiors were painted the standard U.S. Interior Green. The instrument panel was black. All subsequent Allison-powered Mustangs were similarly painted. A cold air induction pipe came up from the floor under the seat and ran forward to a point just behind the fuel system control knob.

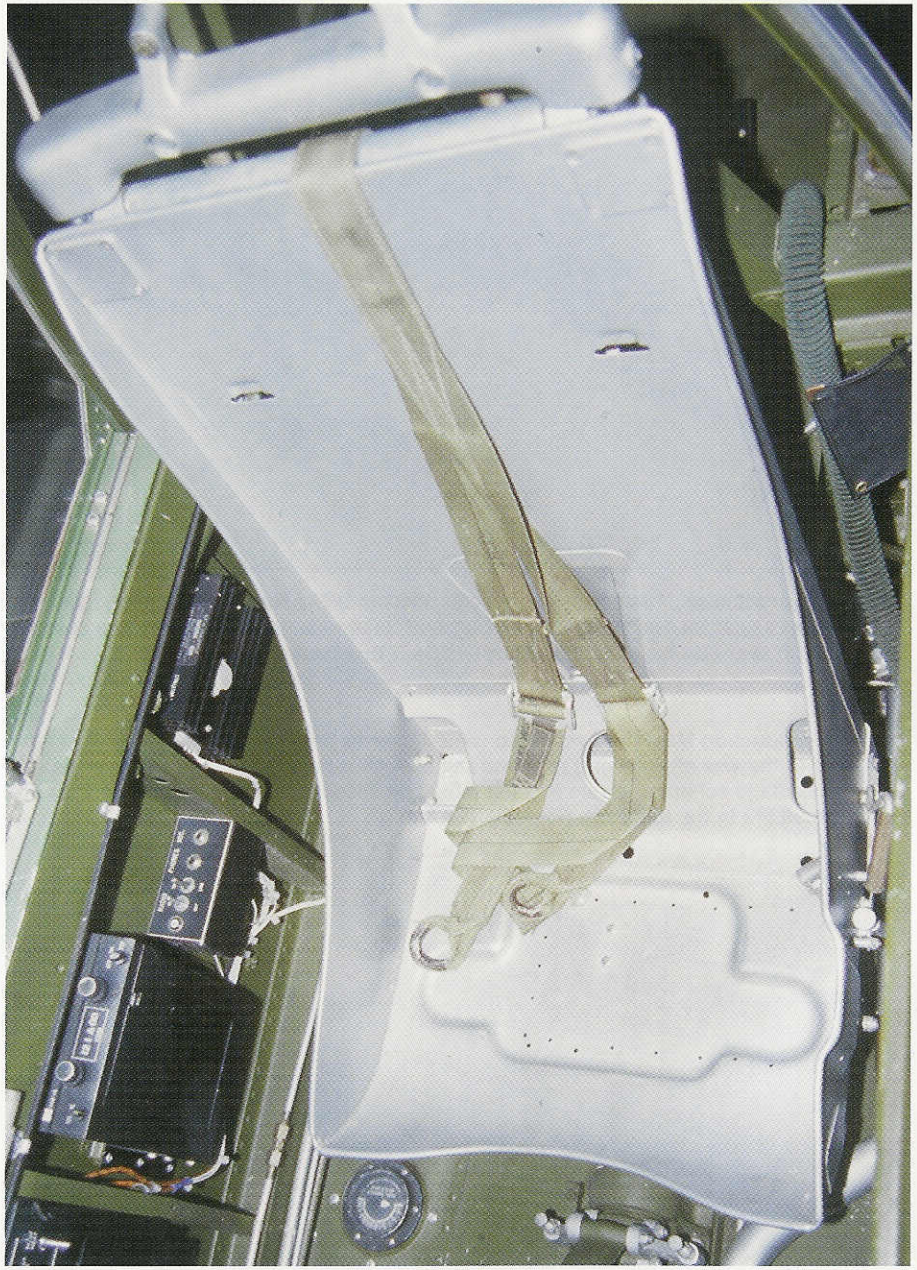




The left side console housed the trim controls, radiator and wing flap controls, and landing gear lever. The oxygen regulator was moved to the right side of the cockpit on later aircraft. The engine controls were built partially into the cockpit sill.

(Below) The large black box with switches is the aircraft electrical panel. The two boxes behind it are modern radios; the larger of the two modern boxes occupies the usual location of the wartime radio transmitter controls. Cables from the rudder pedals to the rudder ran along the outer edge of the floor. Although North American fitted one aircraft with a British-style spade grip, RAF Mustang Is were equipped with a standard stick and pistol grip.

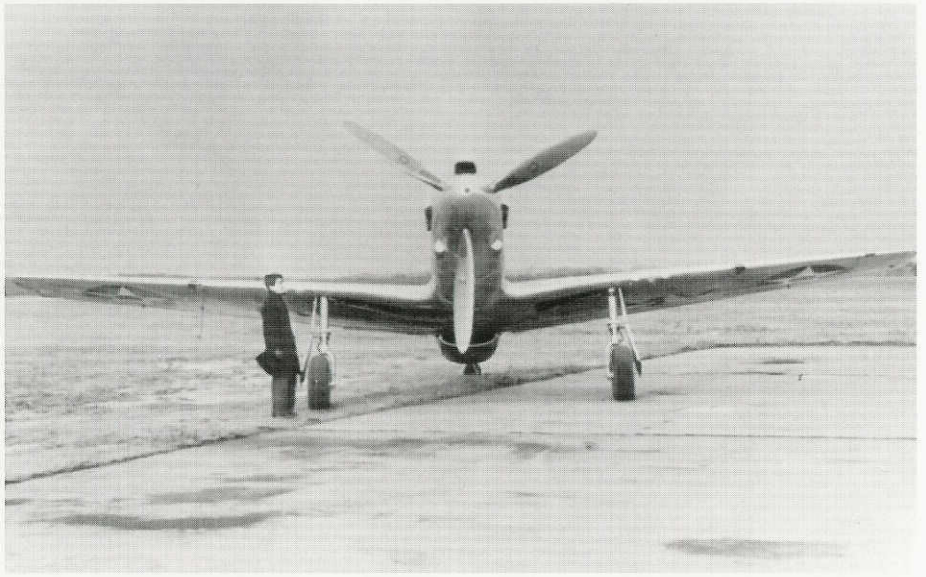




Originally, Mustangs were fitted with wooden seats with metal fittings. Later, metal seats, as seen here, replaced the wooden seat. The seat could be adjusted for height. Gauges for the wing fuel tanks were set into the floor at the front corners of the seat.

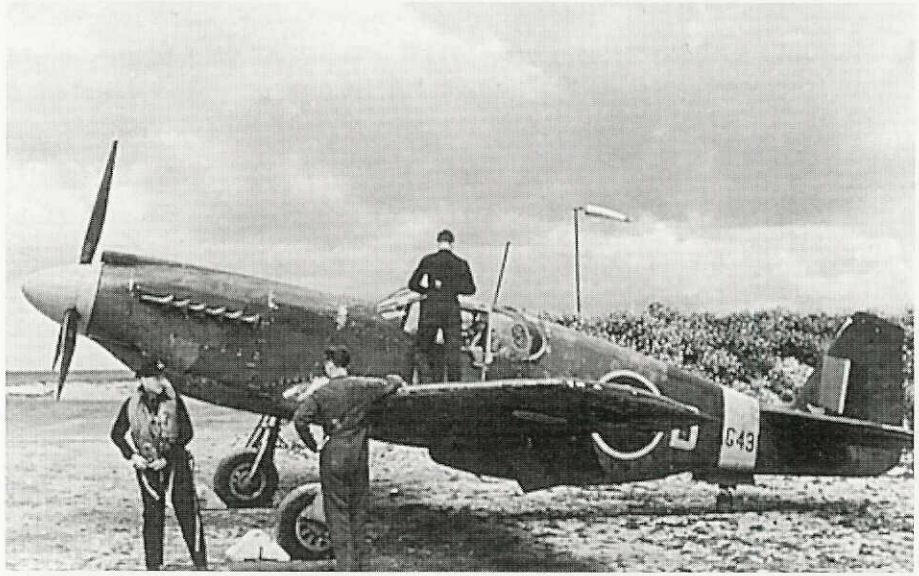
The fourth production Mustang I was allocated to the USAAF as the XP-51 and serialed 41-038. It was equipped with the long carburetor intake with a distinctly oval shape to the inlet. 41-038 spent its life as a test aircraft. (USAFM)

The 10th production Mustang I was also turned over to the USAAF as 41-039. It is seen here later in the war after having received the USAAF regulation Olive Drab over Neutral Gray camouflage scheme. It also has the late style antenna mast. The radiator inlet and outlet ramps are in the full down position. (EAAM)



The clean lines of the Mustang I are evident and they were a major factor in contributing to the aircraft's speed and range, but were a detriment when it came to using the aircraft as a dive bomber. This aircraft is equipped with the early Curtiss 10'6" propeller with pointed tips. (USAFM)

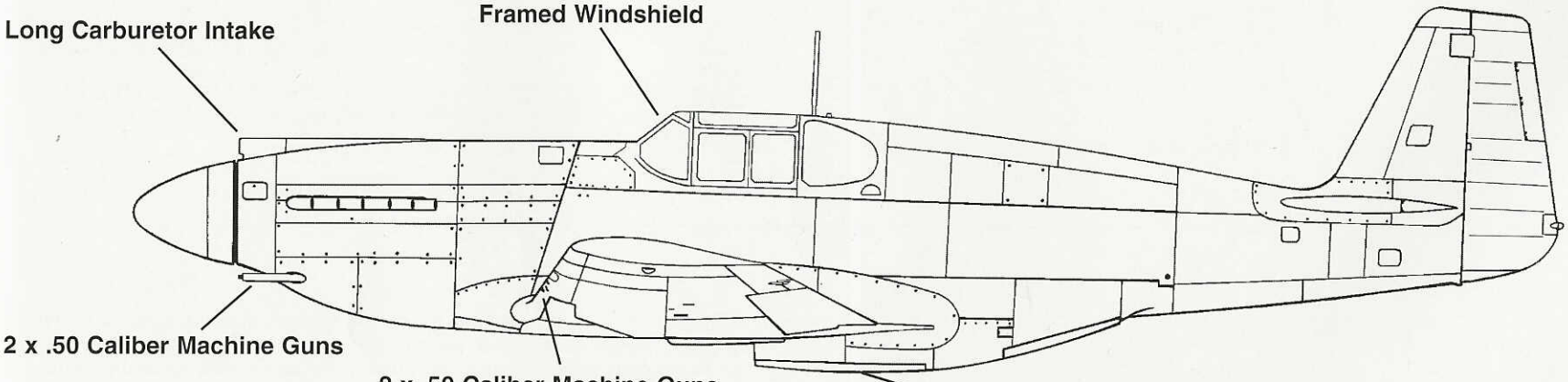
Mustang I, RM~G/AM148 of 26 Sqdn, RAF in 1942. It is representative of the type with a Dark Green/Ocean Gray over Medium Sea Gray camouflage scheme, Sky fuselage band, codes, and spinner, the flattened tube type antenna, and flow through exhausts. The hole in the spinner was left as a result of the manufacturing process and was often plugged with a synthetic rubber plug. (via Scale Aircraft Modeling)

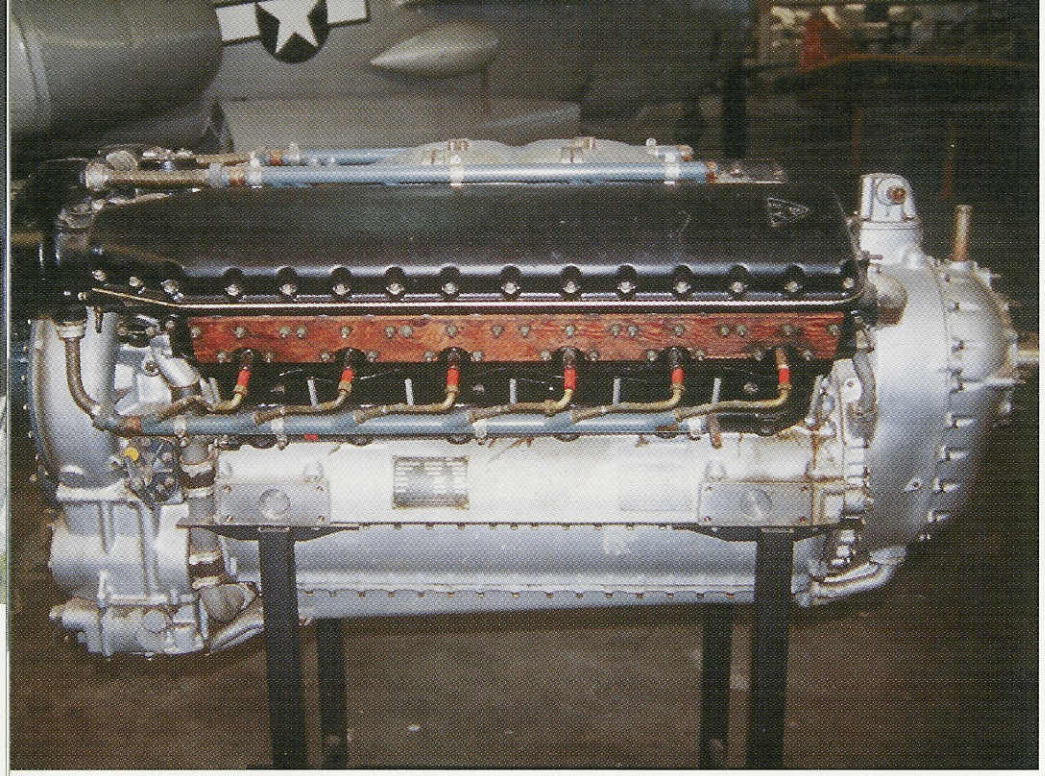


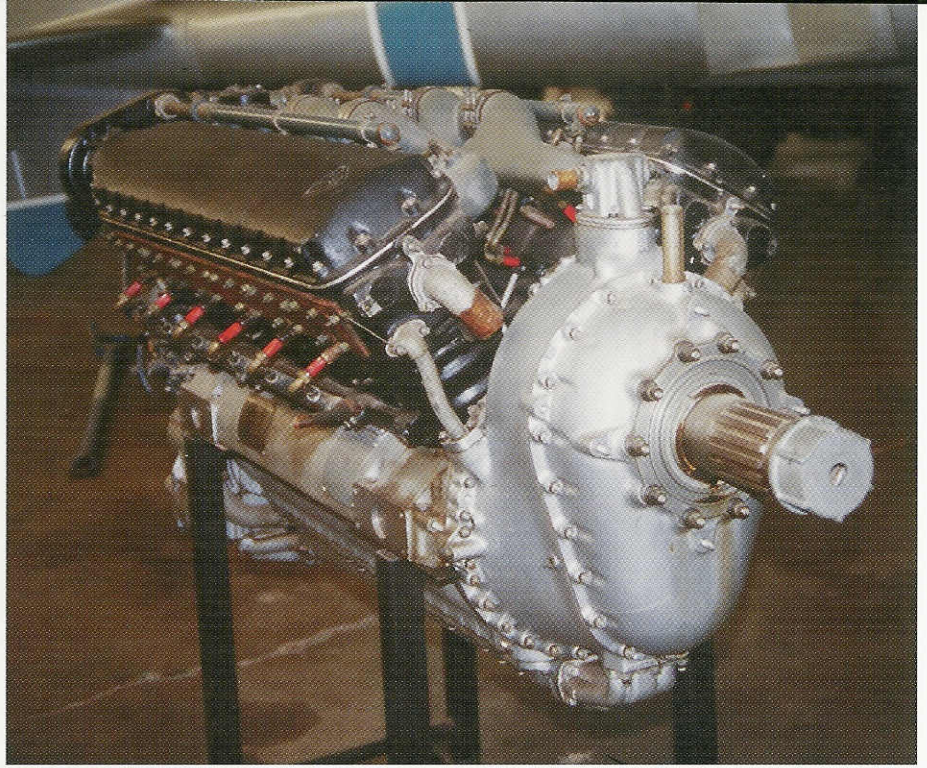
D/AG431 sitting on an English airfield sometime after mid-1942. The aircraft is equipped with the fishtail exhausts fitted to many Mustang Is and has unshrouded cowl guns. Small triangular plates, (unusual at this late date) are fitted over the wheel hubs. A small oval cutout has been made to the rear quarterlight window for a camera. (Jeff Ethell via Larry Davis)

Mustang I, XV~V/AG473, of 2 Sqdn, RAF. Eventually, the RAF and RCAF operated 19 squadrons equipped with Mustang I, Ia, and II. The first, 26 Sqdn, was also the last, operating their Allison-powered Mustangs into 1945 in the photo reconnaissance role. (via R.L. Ward Collection.)

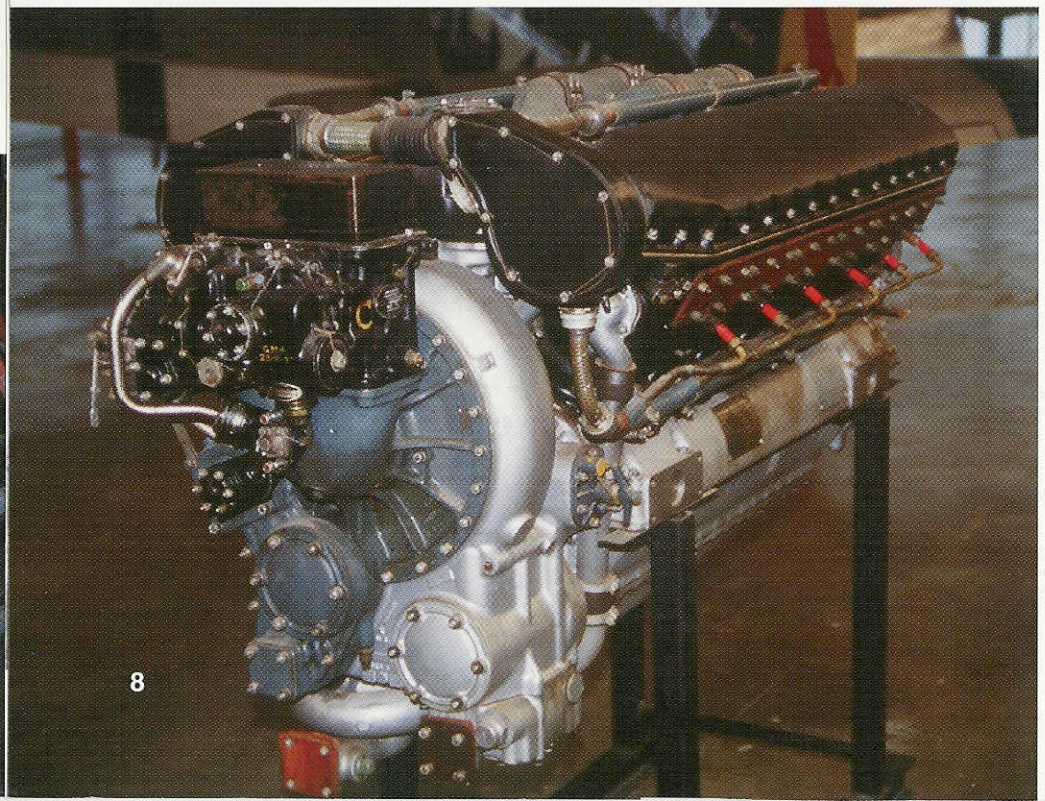
Mustang I (RAF)


Long Carburetor Intake
Framed Windshield
2 x .50 Caliber Machine Guns
2 x .50 Caliber Machine Guns
2 x .30 Caliber Machine Guns
Variable Radiator Intake Scoop



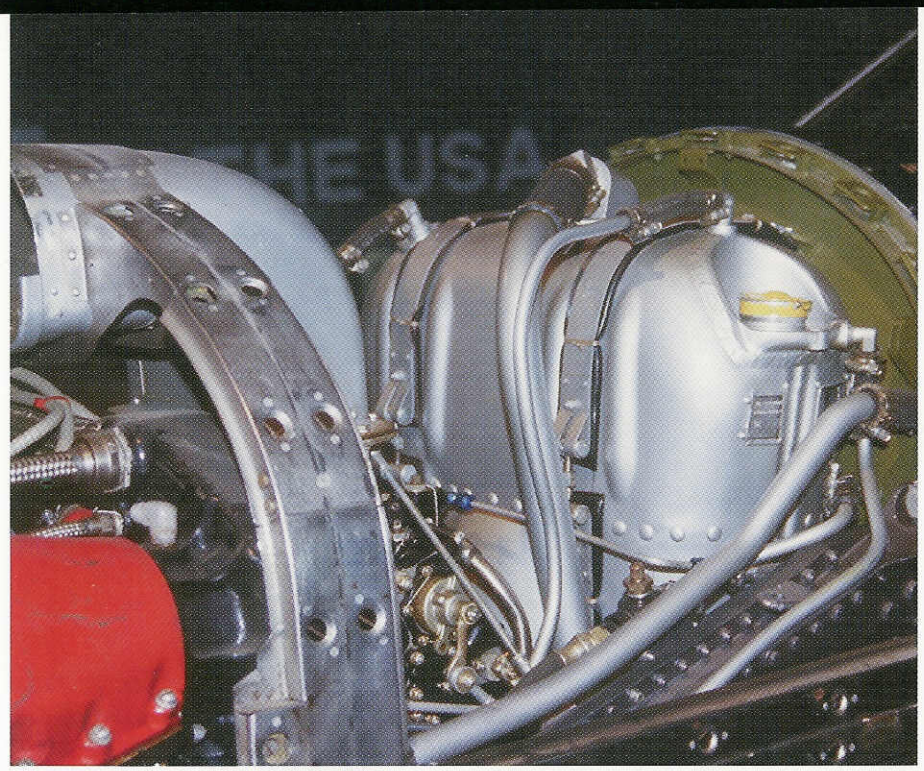


(Above) The Allison engine of the Mustang was a 12-cylinder, liquid cooled, 60 degree, V-type with a 5.5" bore and 6" stroke giving a displacement of 1710 cubic inches. The "F" series had the propeller reduction gear bolted directly to the front of the power section.

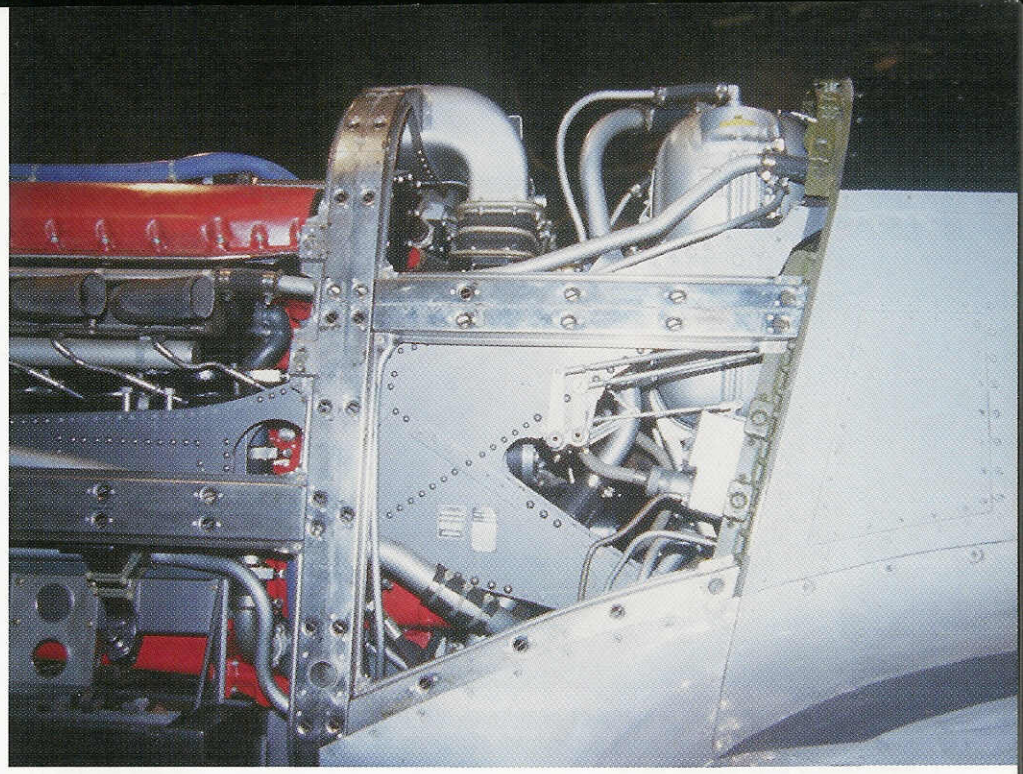


(Above Left) All Allison-engined Mustangs were powered by the Allison V-1710 "F" series engine. Three different variants were used, differing only in horsepower, type of carburetor, magnetos, and minor external fittings

The rear of the engine housed the various gear or shaft driven accessory components, the Bendix-Stromberg injection carburetor, and the single stage supercharger. Air was drawn through the upper cowl ducting, mixed with fuel in the carburetor, passed through the supercharger where it was then force fed into the intake manifold running between the cylinder banks.

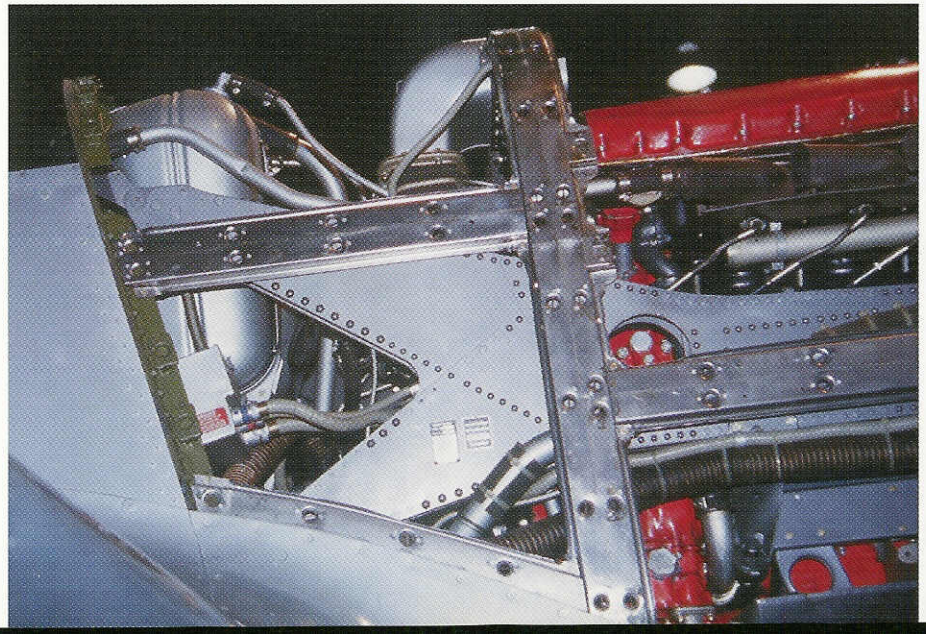


The engine accessory bay was covered by a single upper and two side cowl panels. This area provided access to the carburetor, engine control linkages, and the oil tank. The oil system held 19 gallons.

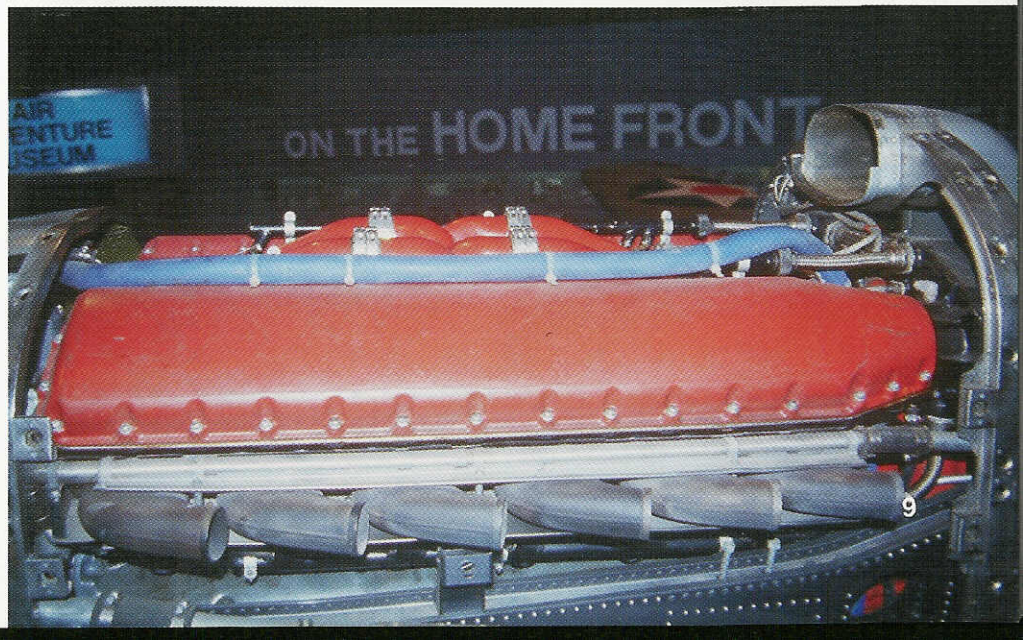


The engine mount consisted of two aluminum alloy box beam structures. The mounts also held fittings for the front fuselage formers and guns. The engine control rods and linkages from the cockpit are also visible.

The engine mounts were bolted directly to the firewall. The firewall was backed with 3/8 inch armor plate.

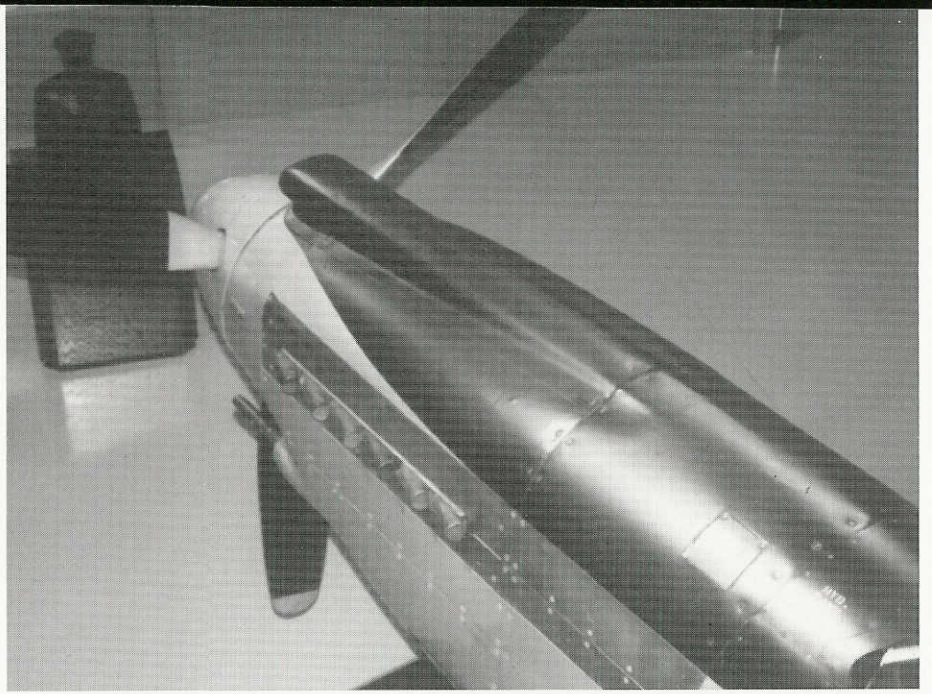


The Mustang I, and a few P-51s, used a flow through exhaust stack that was more-or-less cylindrical. Each had a prominent seam and a noticeable lip at the end.



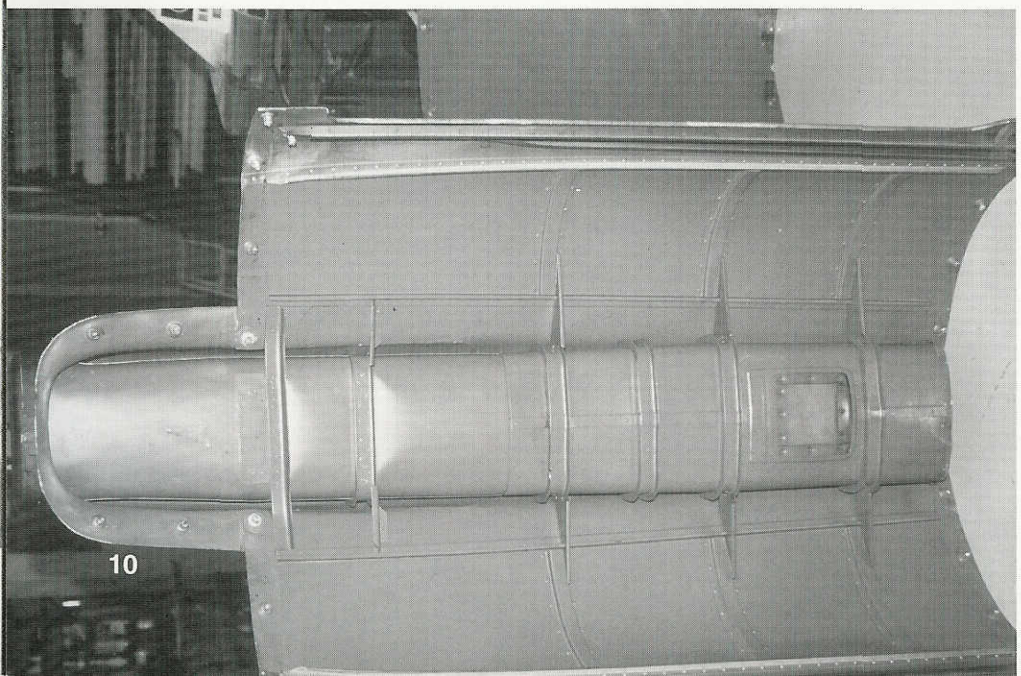
The engine panels were made of aluminum alloy. The engine sub-panels immediately adjacent to the exhausts were made from stainless steel to counter the effects of exhaust heat, hence their darker color.

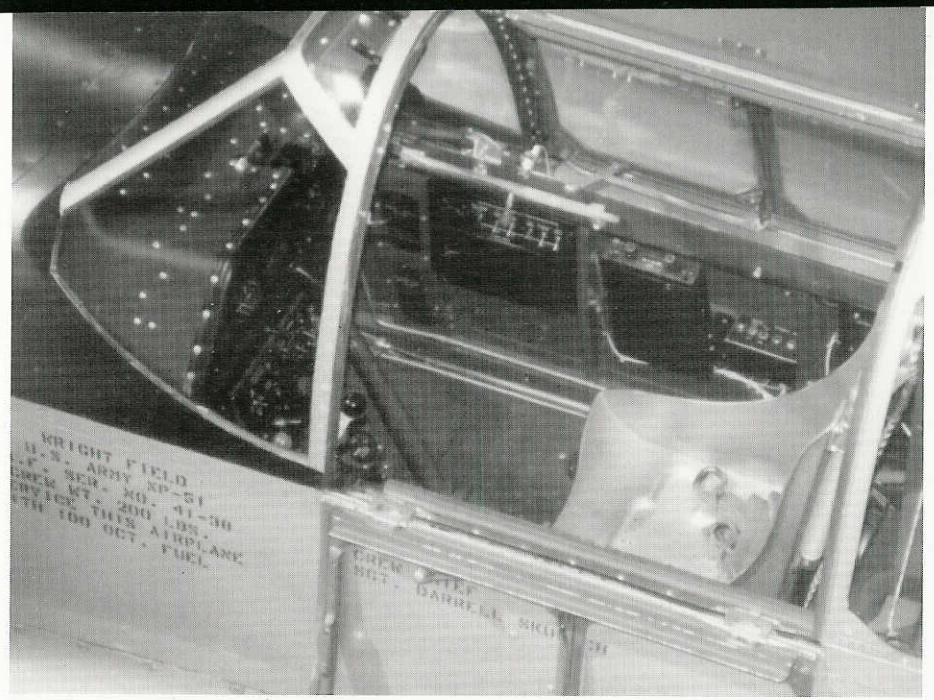
The carburetor intake trunking was integrally built into the upper cowl. The small square door could be opened to allow warm air from the engine bay into the carburetor in the event of icing conditions.



All but the first few Mustang I airframes had a long carburetor air intake with parallel sides. All five engine panels could be easily removed via Dzus fasteners. The nose ring was bolted rigidly in place. Most Mustang Is also had tubular flow through exhausts.

Both front panes of the canopy side panels could be opened, sliding to the rear. The additional framing resulted in two different shapes to the side panel glazing. The small bulges on the spine are cockpit air outlets.



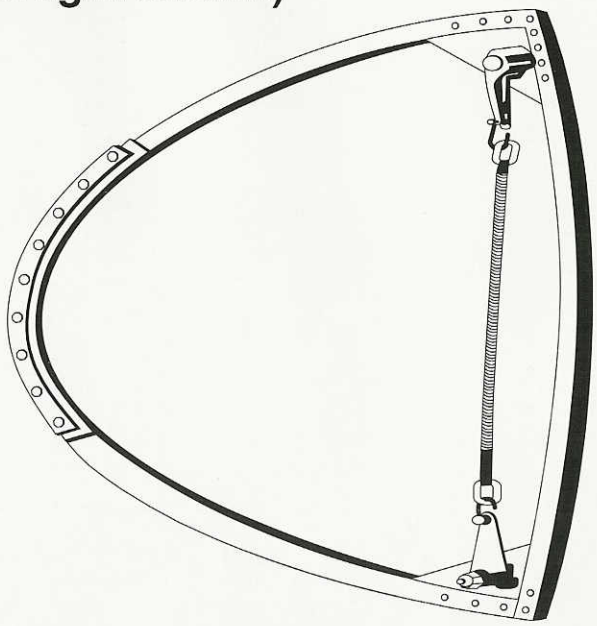


The adjustable seat and rudder pedals made the cockpit roomy for all but very tall pilots. The later Malcolm Hood would provide even more room as well as improved visibility. On the down side, the cockpit was often described as excessively hot and noisy.

The sliding front panels made the aircraft easy to taxi merely by having the pilot hang his head out the window. A third vent widow was often added to the left front quarter panel on the later P-51A.

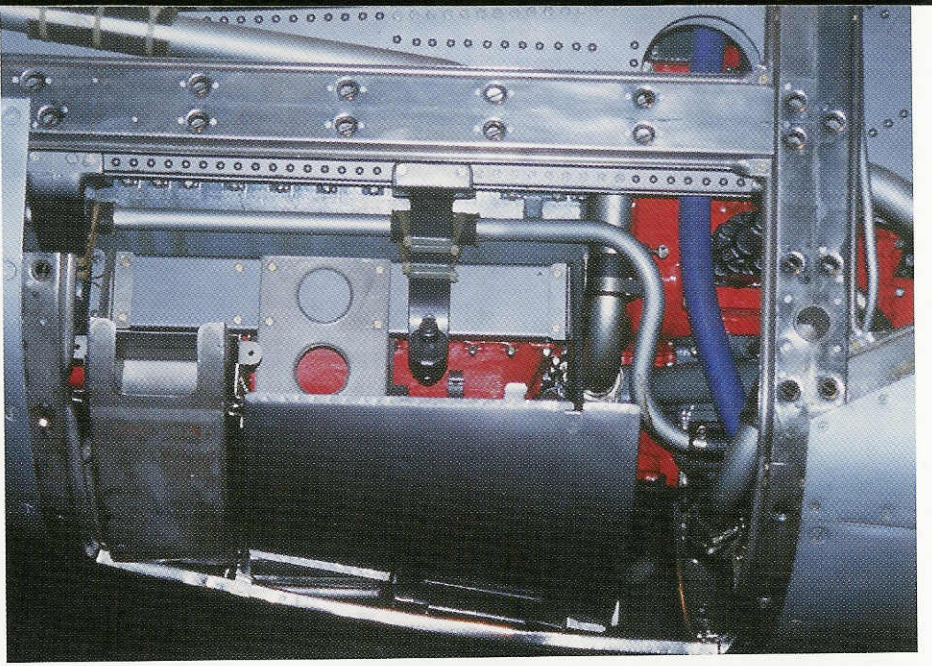
Reconnaissance Mustangs were fitted with cutouts in the rear quarterlights (usually on the port side, but sometimes both) for the camera. The shape of the cutouts also varied. (via R. L. Ward Collection)

Rear Quarterlight Interior (Port quarterlight shown)



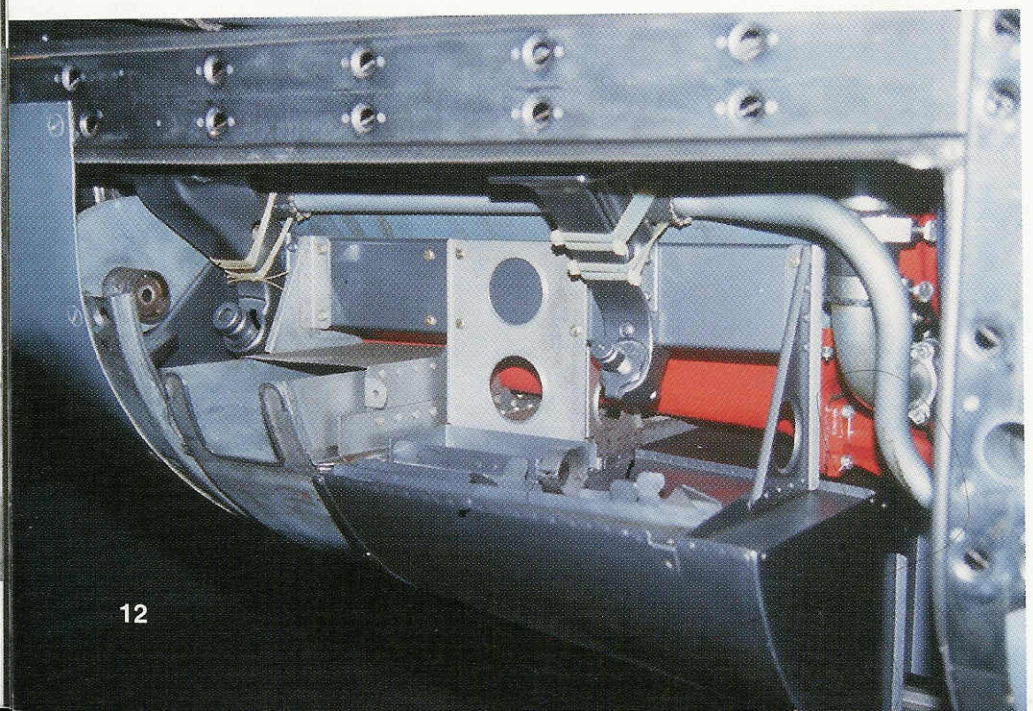
The lower cowl consisted of a left and right half, each incorporating a shroud for a lower nose mounted .50 caliber machine gun. These shrouds also functioned as air inlets for the sparkplug cooling tubes. Some of the gun shrouds were tear-drop shaped while others were more cylindrical.

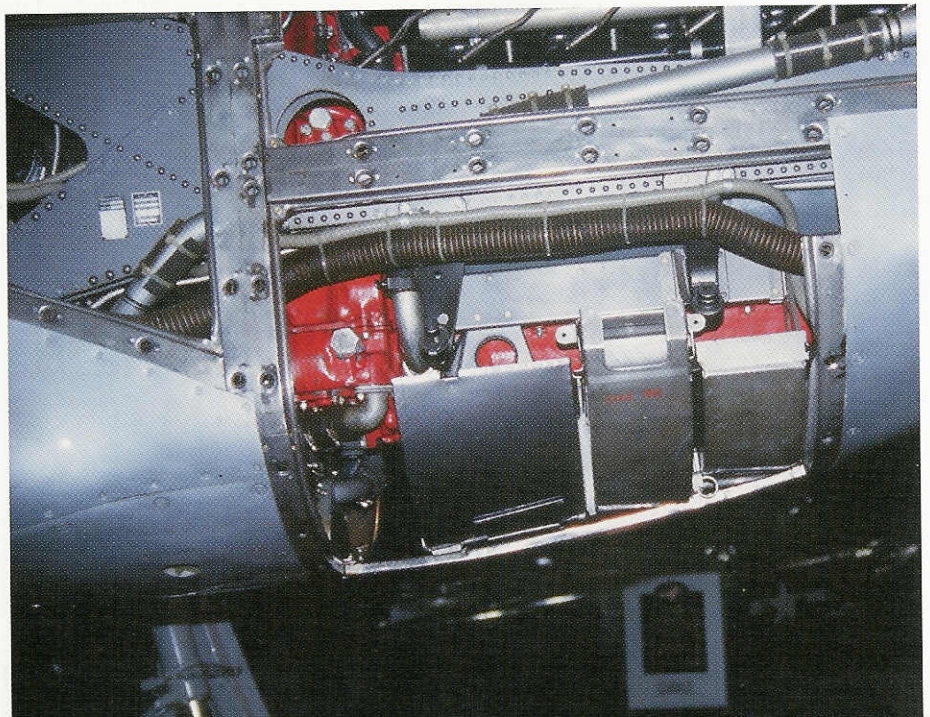
Spent cartridges and links from the guns were emptied into a common box at the rear of the ammo compartment.

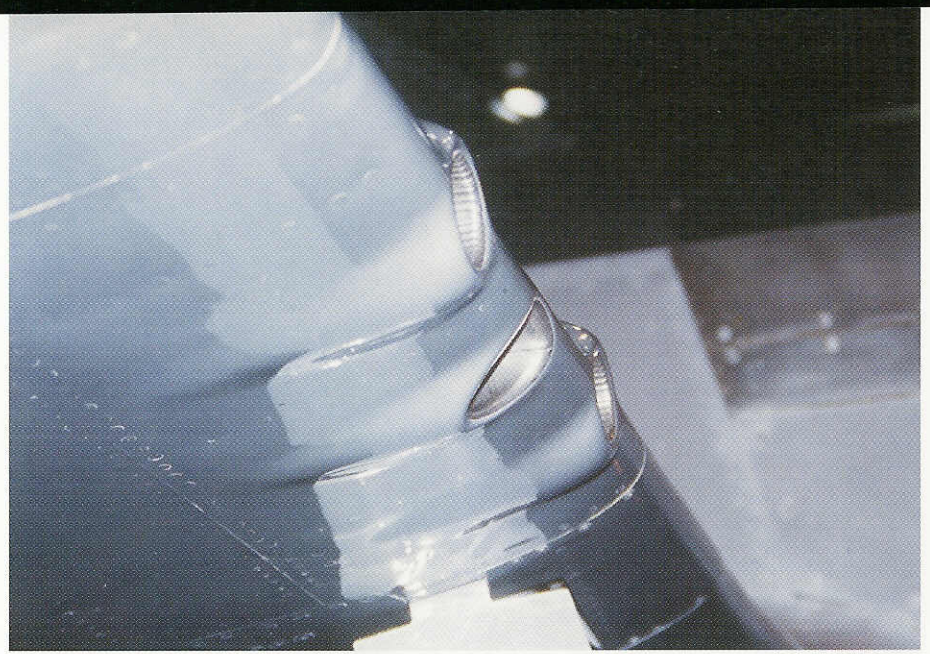


By necessity, the nose guns were staggered (port gun most forward) to allow overlapping clearance for the ammo boxes. Each box held about 200 rounds depending on the size and shape of the ammunition box installed.

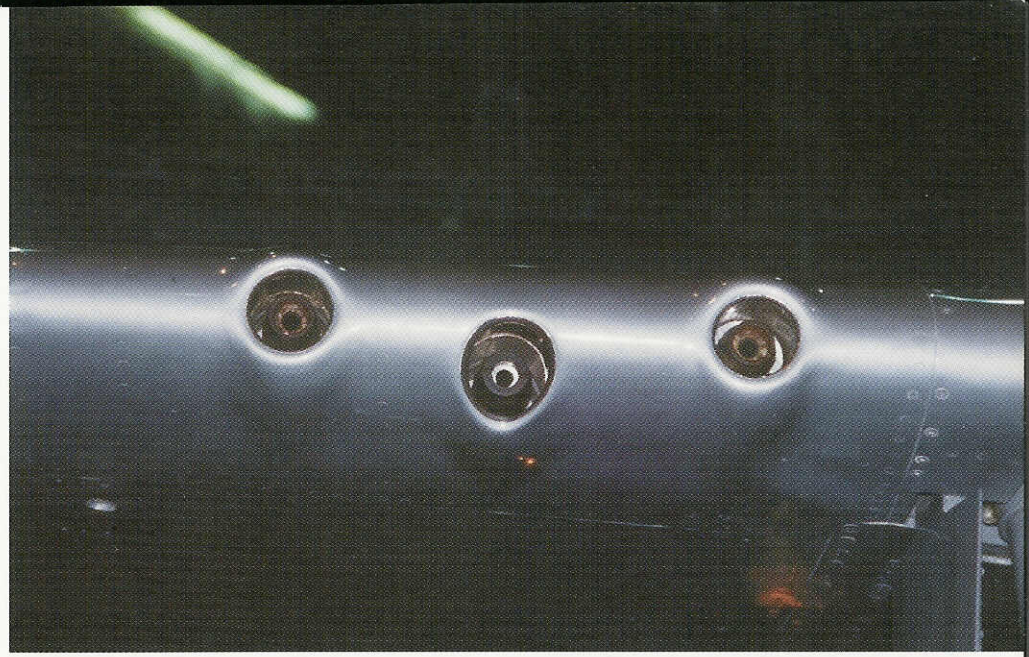
All of the boxes wrapped around the bottom of the engine and conformed to the inner shape of the lower cowl. Although easily accessible, it was still a tight fit.





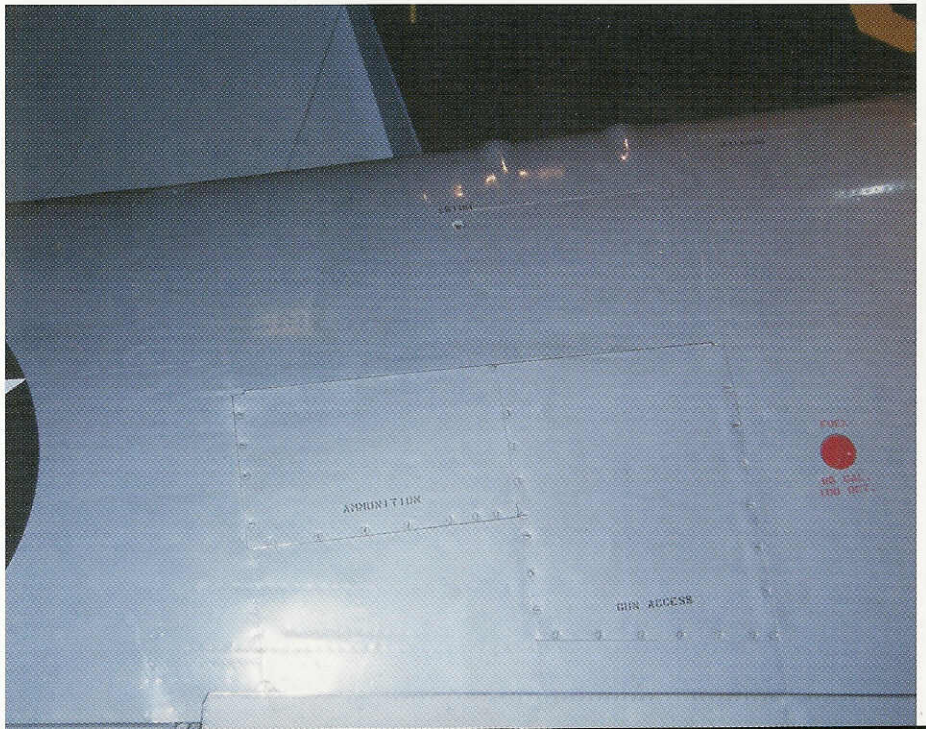


Mustang Is were equipped with three guns in each wing — an inboard .50 caliber and two outboard .30/.303 caliber weapons.

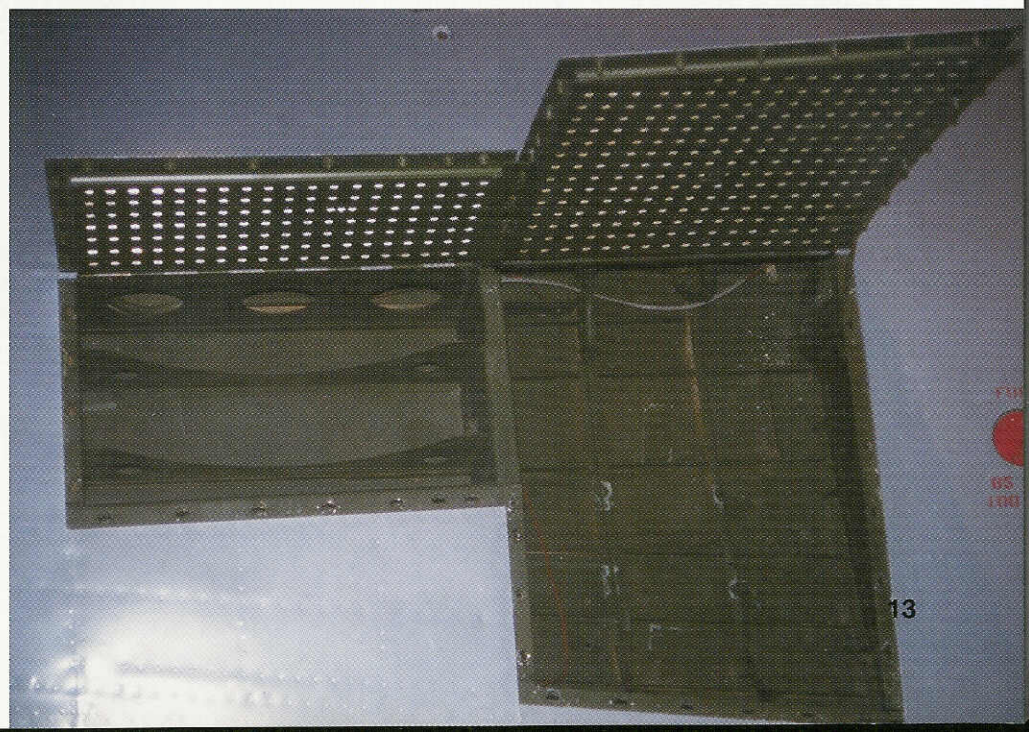


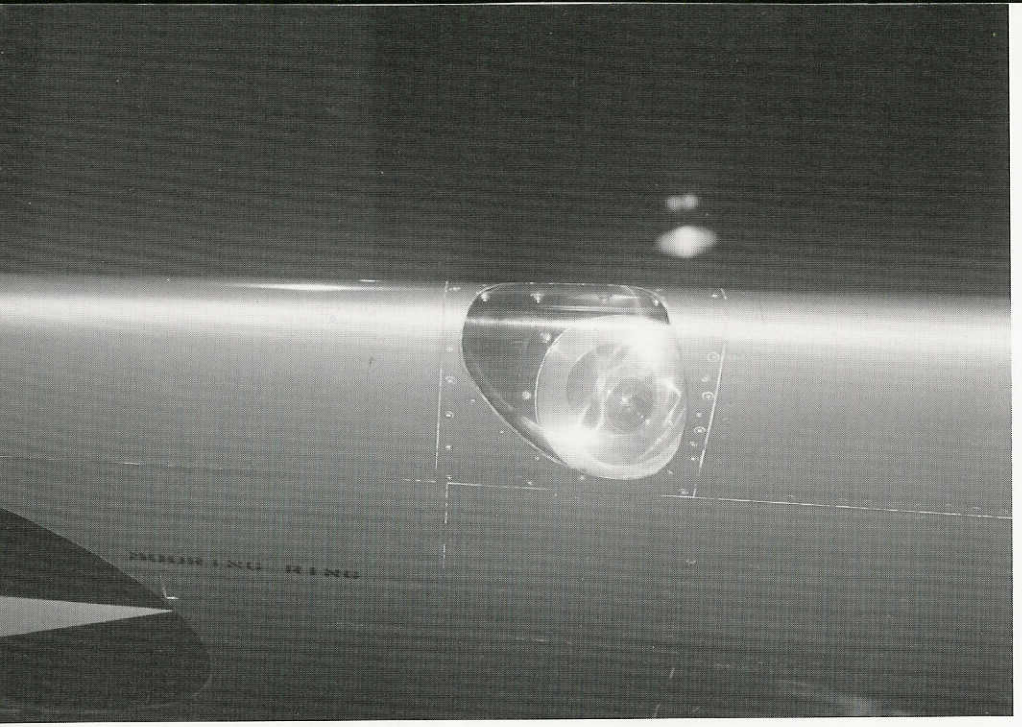
The guns were staggered fore-and-aft and vertically to provide clearance in the wing. Each of the openings in the wing had a small lip.

The gun bay was covered by a single piece, Dzus fastened hatch. The ammo bay was similarly covered.

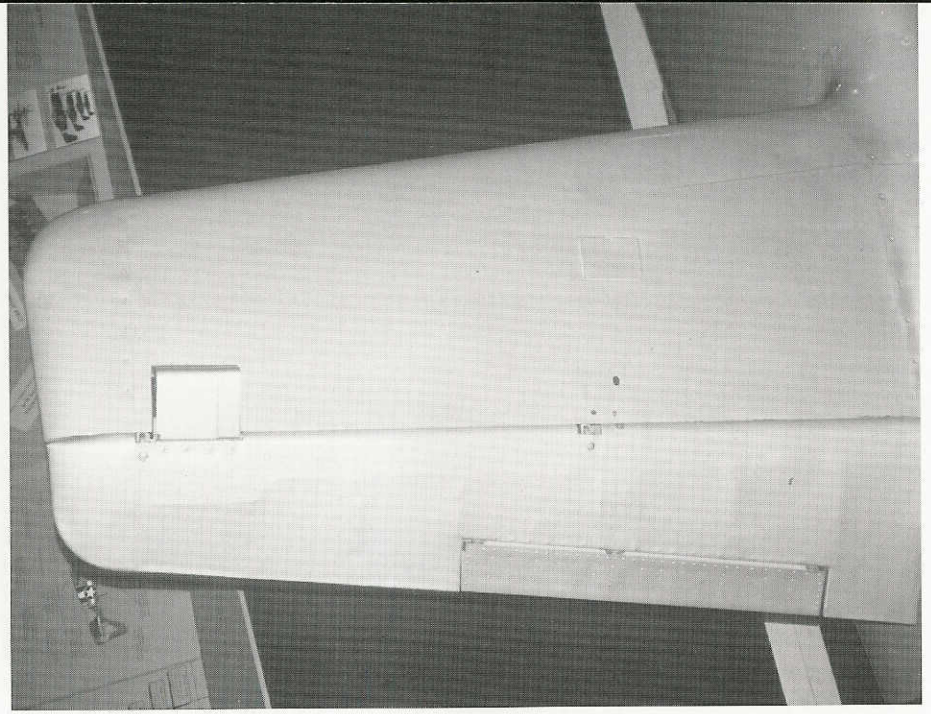


The .50 caliber gun was fed from the center ammo box. The front box fed the middle gun, while the rear box fed the outer gun. Feed chutes were used to prevent jamming, although they didn't always work.



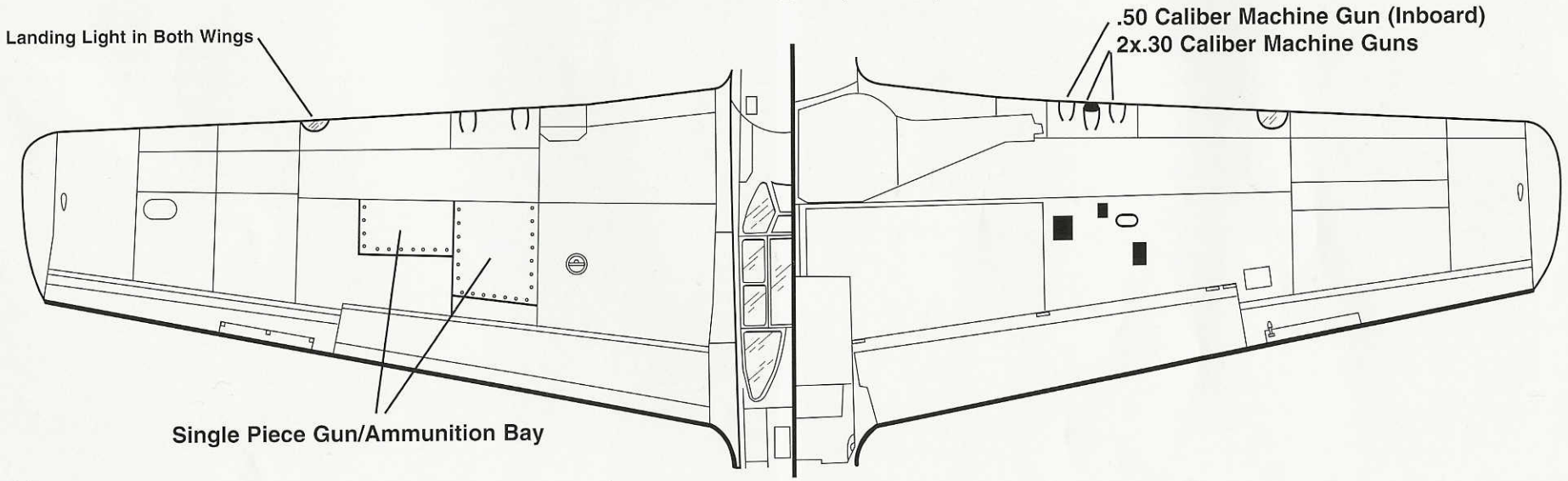


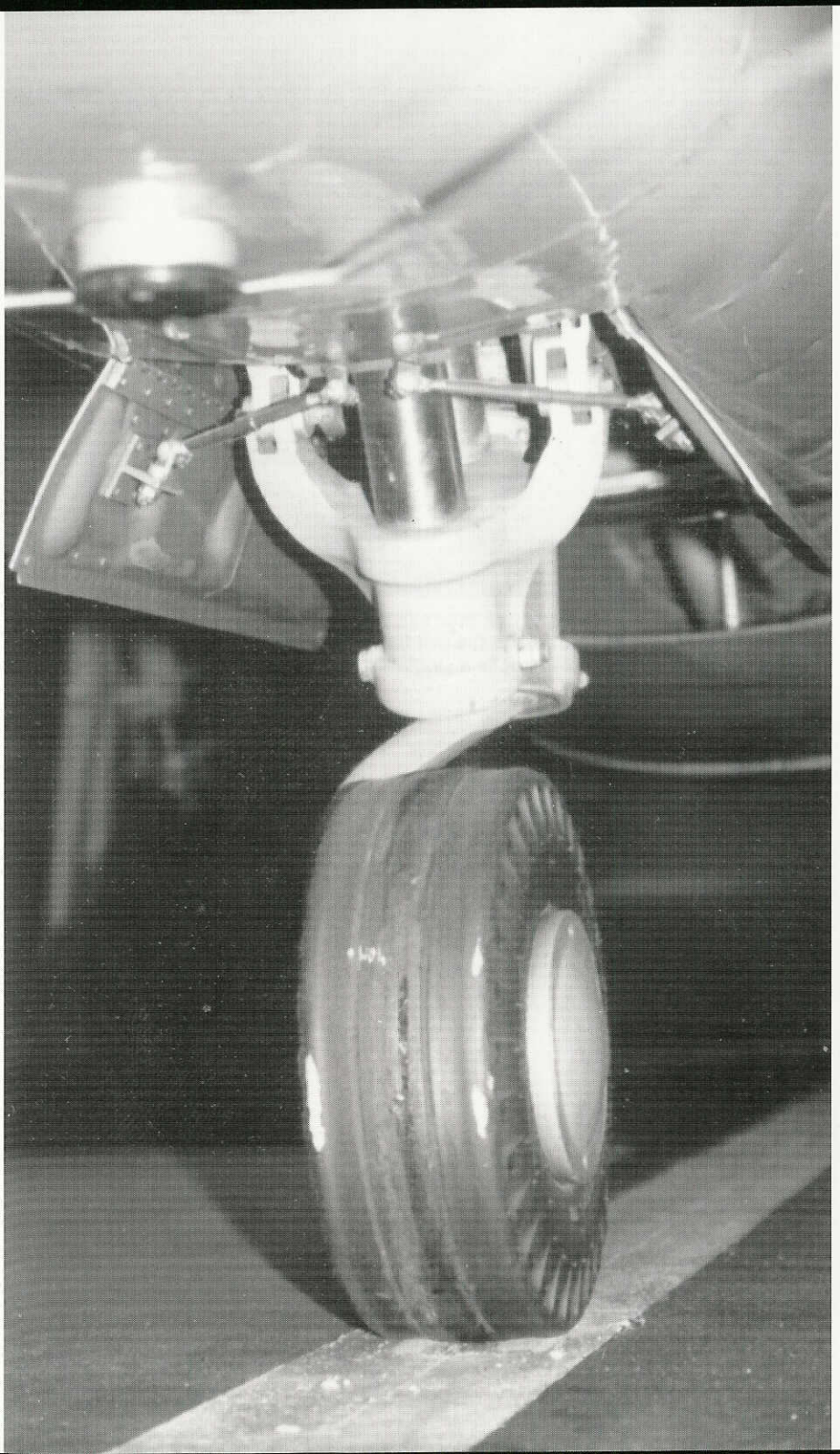
Mustang Is were equipped with a landing/taxi light embedded in the leading edge of each wing about three feet from the outboard guns.



The horizontal stabilizer was built in one piece with detachable tips. The similarly constructed vertical fin was attached to the fuselage and horizontal stabilizer forming an interlocking unit. The elevators and rudder were fabric covered.

Mustang I (RAF)





Mustang I, O/AM251, of 414 Sqdn, RCAF. The aircraft is finished in Dark Green/Ocean Gray over Medium Sea Gray with what appears to be fresh paint over a portion of the cowl. The aircraft is equipped with fishtail exhausts. The cutout in the rear quarterlight has a rounded egg shape to it. (via R. L. Ward Collection)

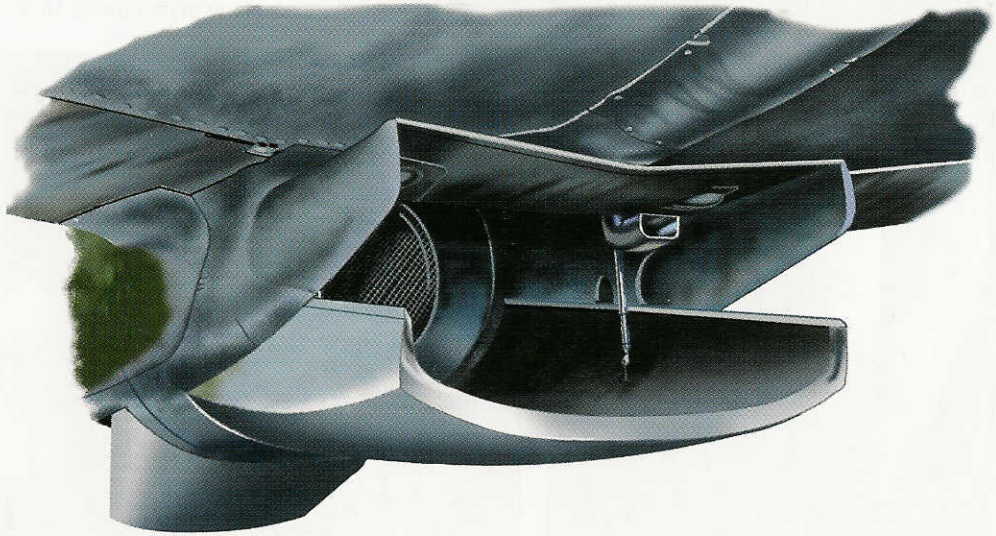
(Left) The tail wheel retracted forward, using two small struts to pull the doors closed behind it. Some aircraft had a small wheel cover added to the hub.

An XP-51 (41-038) survived the war and long term storage to be fully restored to air worthy condition in the EAA Museum in Oshkosh, Wisconsin. The aircraft has been painted with a silver lacquer to represent its original appearance when delivered to the USAAF. It is now equipped with the later style Curtiss 10' 9" propeller.

The Mustang I was equipped with a variable inlet for the radiator and oil cooler. The radiator and it's trunking were designed to take advantage of the "Meredith Effect" — outside air was rammed into the intake trunking, compressed and heated as it passed through the radiator/oil cooler core, where it expanded as it passed out the rear through the variable exit flap. The net result was a quasi-jet thrust and negative drag through the large coolers.

When fully closed, the radiator exit flap still had an opening. Additional contouring ensured a smooth flow of air around the exit flap and lower aft fuselage. The area behind the radiator exit flap could also house a single K-24 aerial camera.

Radiator Intake

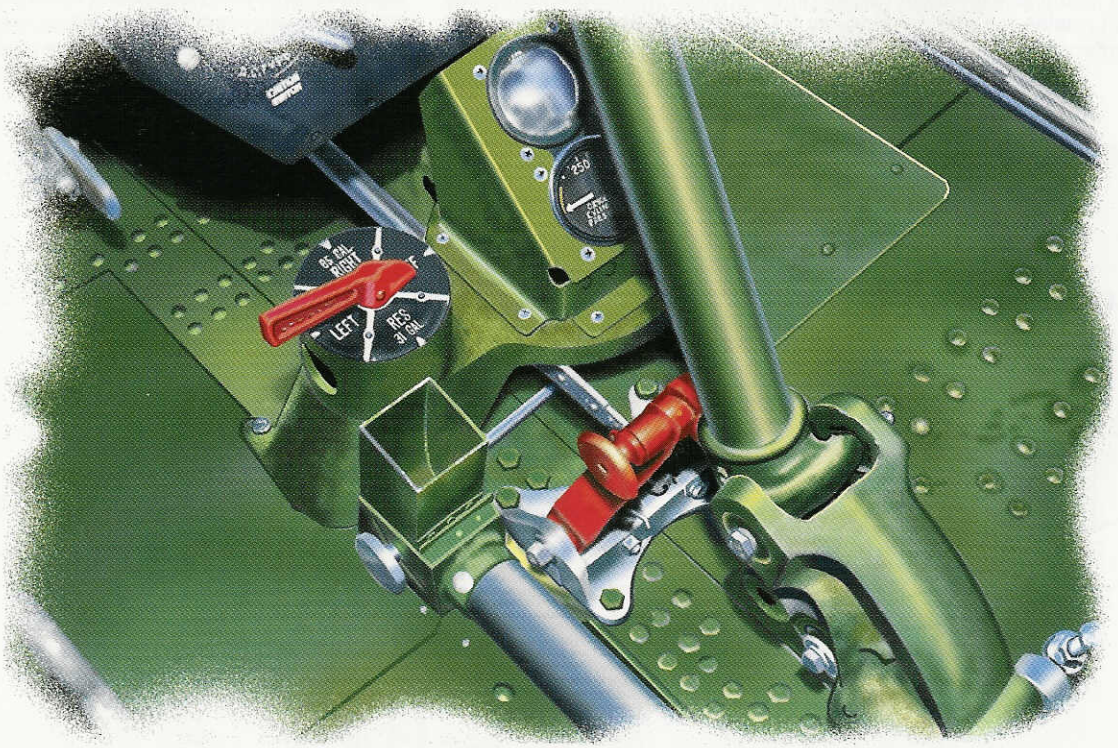


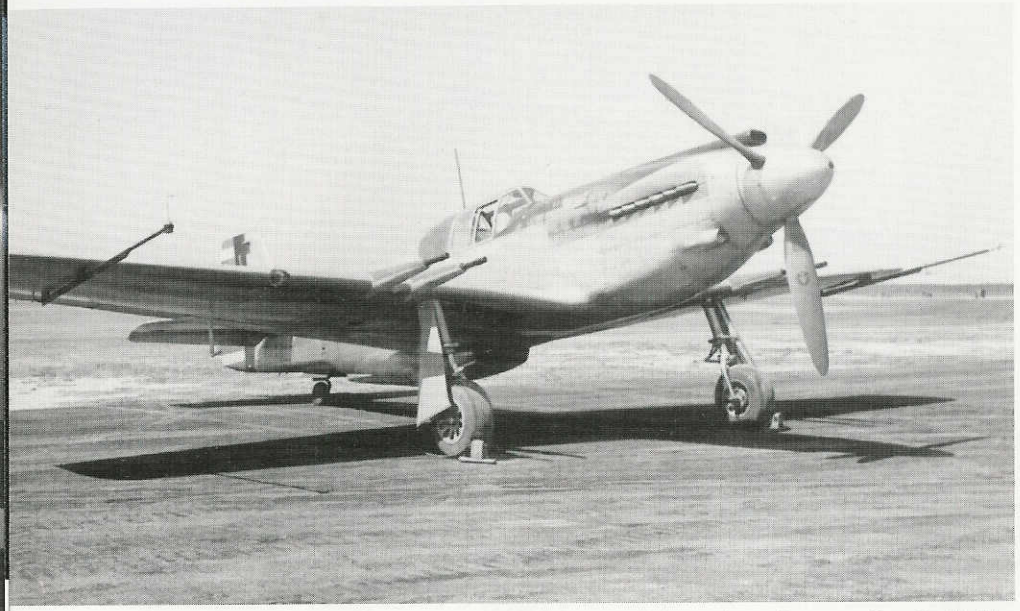
Radiator and Oil Cooler

Front

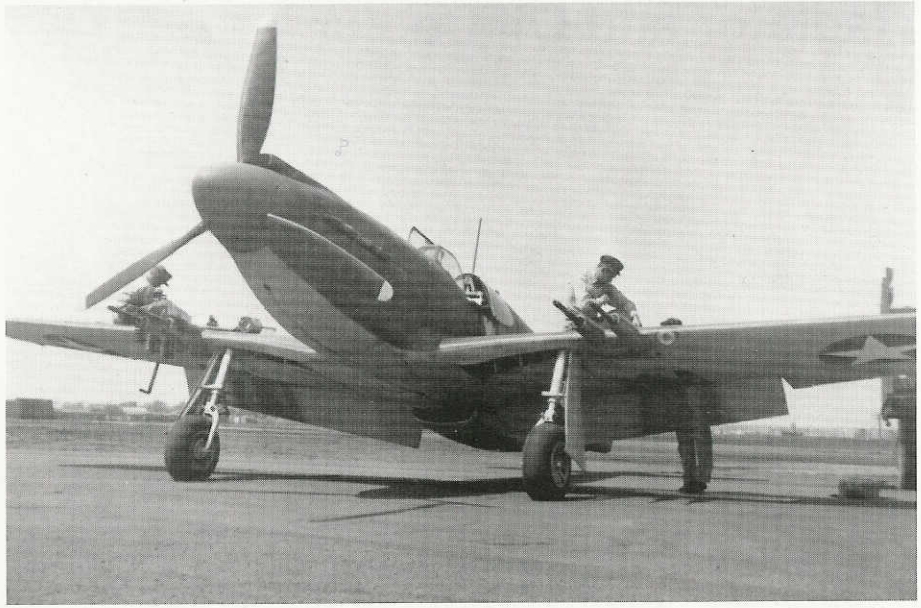
Rear

Cockpit Floor



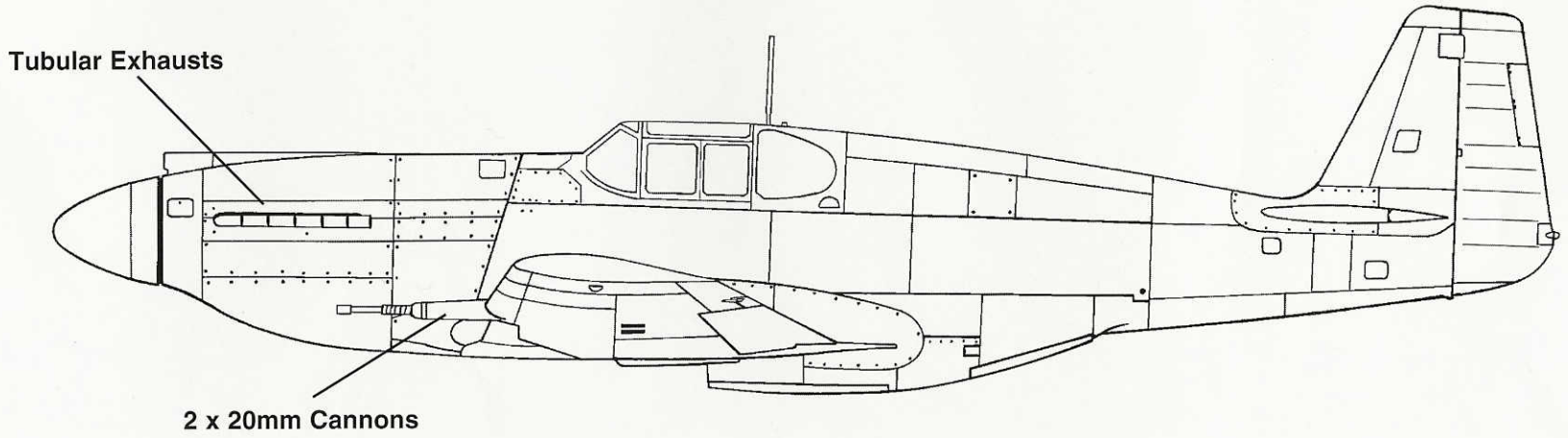


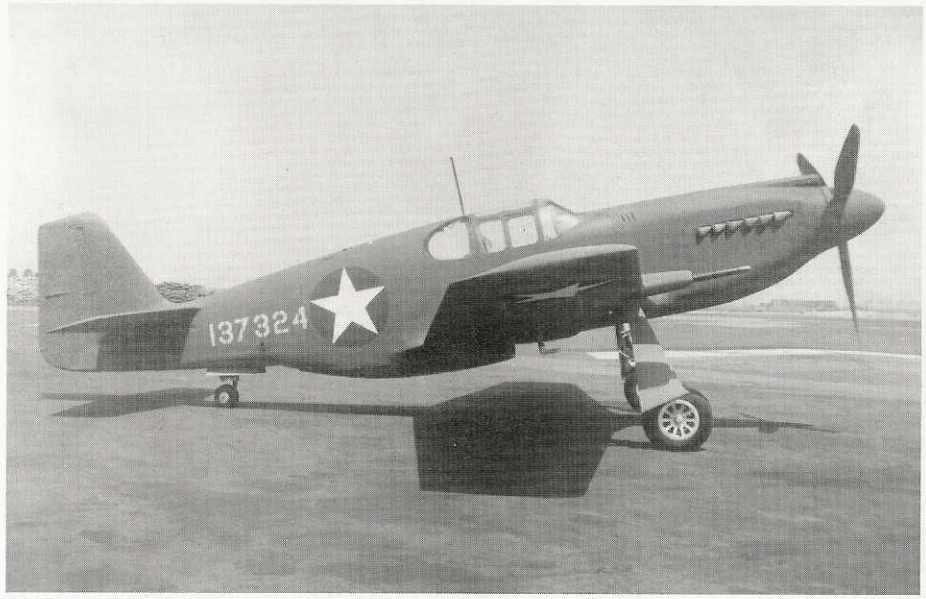
An XP-51 (41-039) was used extensively as a test bed throughout the war. Eventually the aircraft was modified to take a pair of 20mm cannon in each wing. This modification led to the P-51. The aircraft retains the original shrouds for the cowl guns and the covered muzzle port for the center wing machine gun is visible between the cannon shrouds. (EAAM)



Each cannon was provided with about 125 rounds. Access to the guns and ammo bay was provided via a single Dzus fastened cover plate in the top wing and the cannon fairing on the wing leading edge. There was some variation in length of the fairings over the gun barrels. The pilot was given the choice of firing two (one in each wing) or all four cannons. The small round port under the nose is the gun camera. (SDAM)

P-51/Mustang Ia

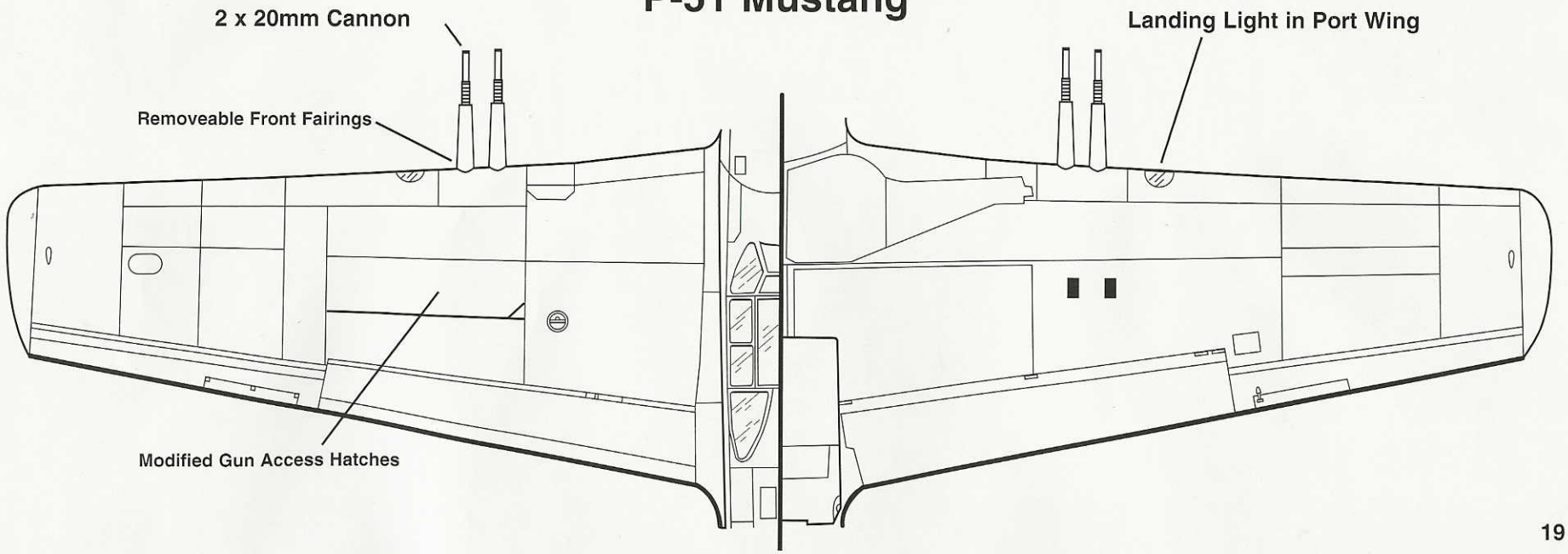




A P-51 (137324) displays the text book application of serial numbers on the aft fuselage. Eventually, the USAAF went to a five digit number. The aircraft has shorter fairings for the guns and the recoil springs are not as prominent as drawings have often portrayed them. The aircraft retains the shorter Curtiss prop, but now has flared exhaust stacks. (USAFM)

The P-51 also retained the variable radiator inlet and outlet flaps. It was the last Mustang to do so. The control stick on the Mustang could be locked using a small device on the cockpit floor in front of the stick. A small pin was inserted through a flange near the base of the stick. When used, the stick was moved slightly forward, resulting in a slight droop to the elevators. (SDAM)

P-51 Mustang



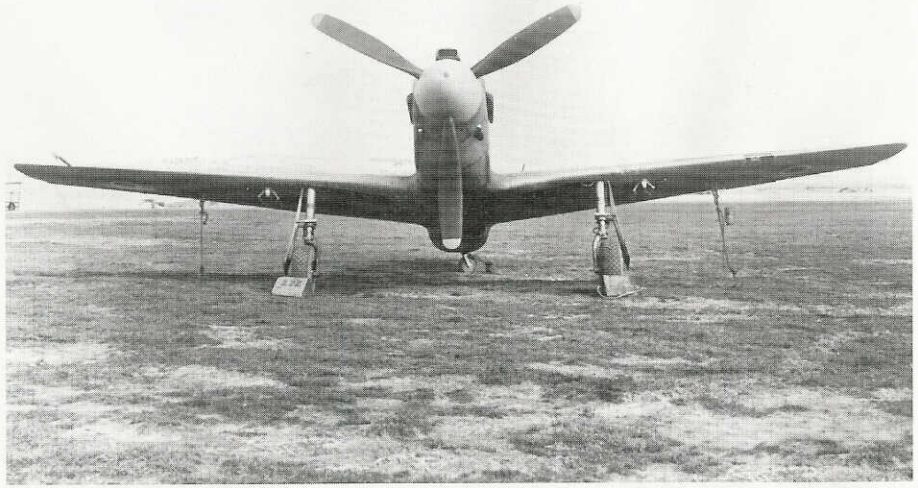
(Above) The 27th Fighter Bomber Group began operations in Morocco in April of 1943 and continued to fly combat operations in Tunisia, Sicily, and southern Italy. Major John Crowder's A-36A *Dorothy Helen* is wearing the standard Torch U.S. insignia with a yellow surround. The fuselage insignia is flanked by the squadron and aircraft code letters. Yellow wing bands and a red spinner complete the basic markings for MTO-based A-36s. (via Jeff Ethell)

(Below) *Dorothy Helen* went through evolutionary changes in her markings. The star-and-bar insignia with a red surround was ordered in June of 1943, but lasted only until September of that year. Regulations called for a four inch thick surround, but these surrounds are noticeably thicker. (via Jeff Ethell)

(Above) *Dorothy Helen* in flight over Sicily. The star-and-bar insignia is in all six positions and all with a red surround, while the tail codes have been moved to the vertical stabilizer. (via Jeff Ethell)

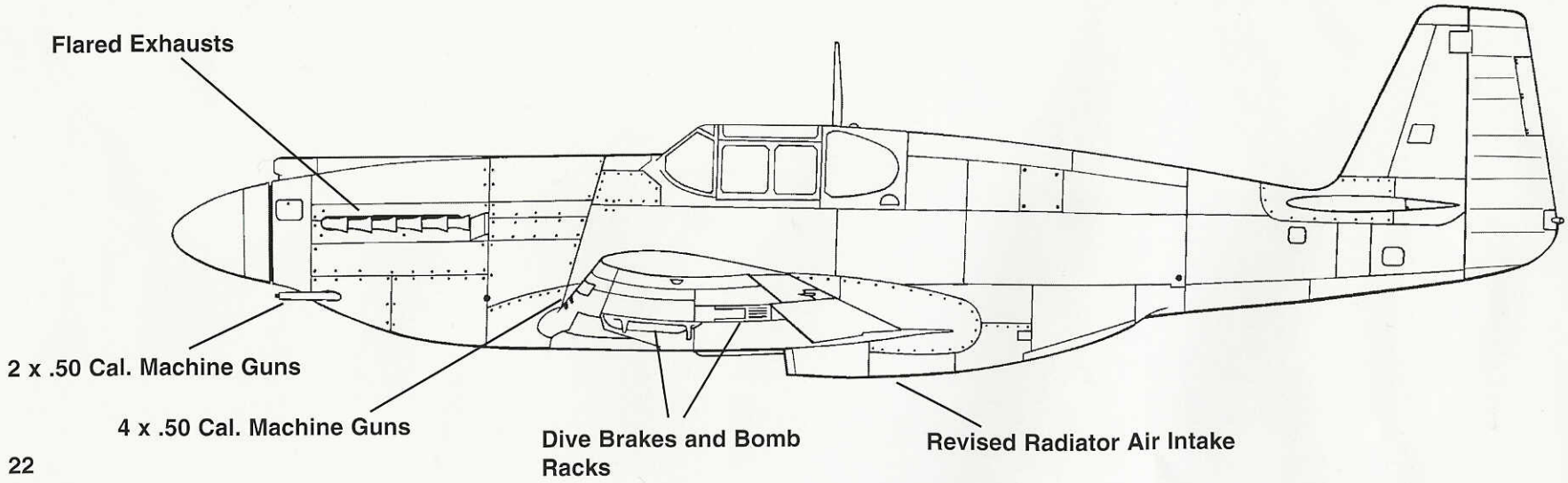
(Below) An A-36A, A~V during the summer of 1943 and looking a little cleaner, is flying over Sicily. The markings are generally similar to *Dorothy Helen.* (via Jeff Ethell)

The times and budget constraints being what they were, money for fighters quickly ran out. As the story goes, North American quickly proposed building P-51s as dive bombers by strengthening the airframe and adding dive brakes and bomb racks. Under the designation A-36 the dive bomber variant immediately began equipping training units in the southern U.S. Combat operations began in the spring of 1943 in North Africa. (SDAM)



The clean lines of the Mustang, which contributed greatly to it's speed, proved to be a detriment in the dive bombing role. The RAF received an A-36 for testing in early 1943, however, the RAF opted to continue development and use of their Hawker Typhoon. A very small number of A-36s were reportedly used by the RAF as armed reconnaissance aircraft in the MTO. (via R.L. Ward Collection)

A-36A



An A-36A Apache of the 27 FBG sits in the arid desolation of North Africa. The aircraft carries the standard Torch markings of early 1943 and is equipped with an unusual antenna mount which was seen only on MTO-based A-36s. The backs of the propeller blades have been scoured down to bare metal by sand and grit. (USAFM)

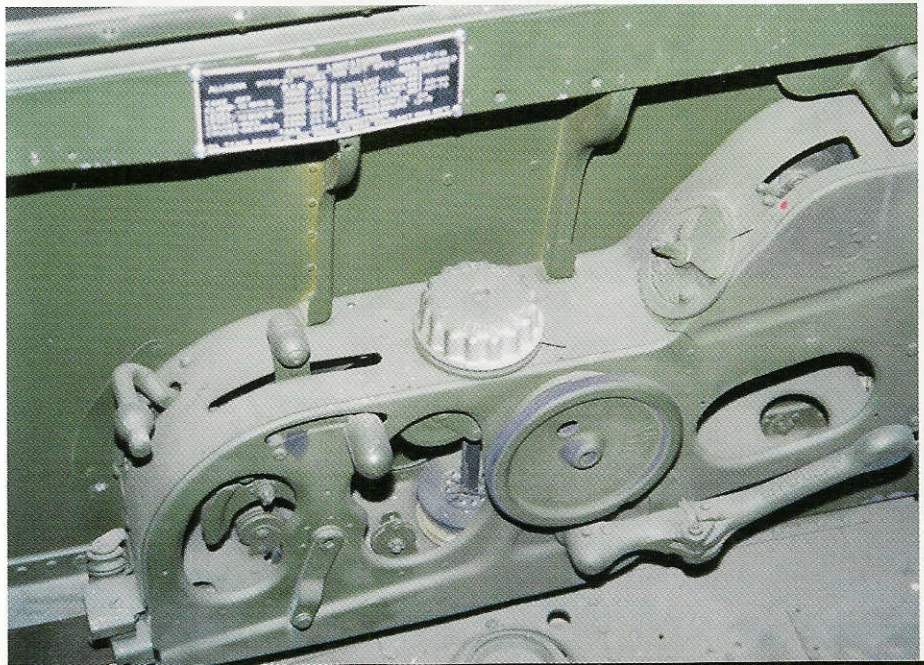
The USAF Museum's A-36 has been externally restored to represent *Margie H* , an aircraft of 16th Fighter Bomber Squadron flown by Capt. Lawrence Dye in the MTO. The aircraft is not air worthy. (USAFM)

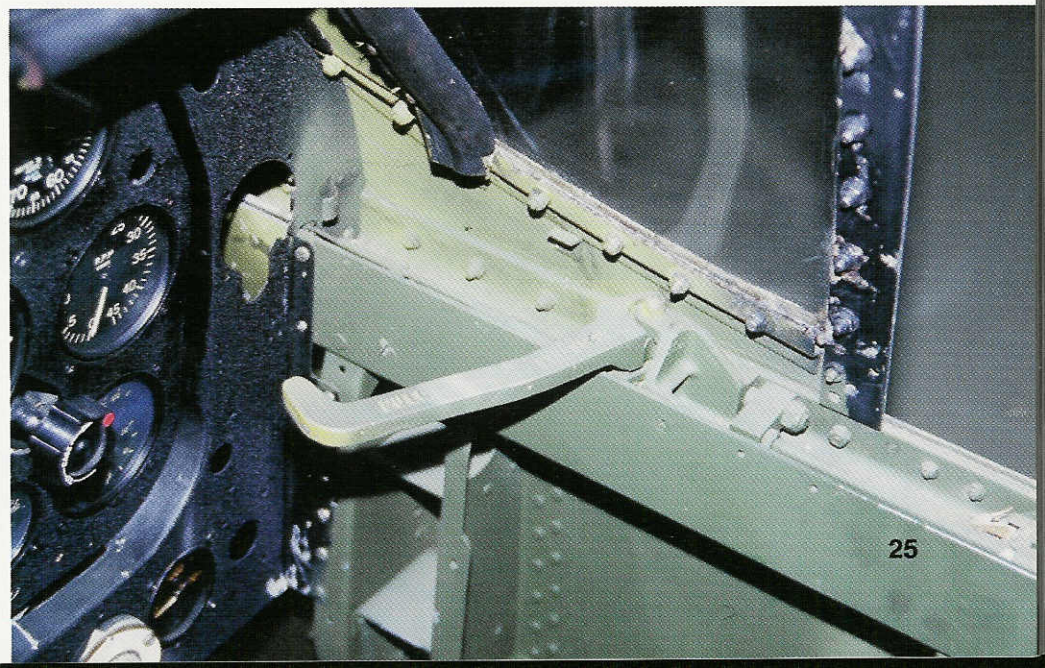
The USAF Museum's A-36A interior is pretty well gutted. Many instruments, controls, and electrical boxes are missing. The lack of accessories, however, does show the structural elements of the cockpit.

Only the mounting holes show where the throttle assembly was located. The gun and bomb control panel, lacking switches, is visible behind the gripless stick. Mustang Is and A-36s had a pair of nose gun charging handles mounted in the instrument panel. The hole for the left gun's charging handle is to the immediate left of the upper leftmost instrument. The T-handle hanging down from the bottom center of the instrument panel is the parking brake.

The console was mounted to the left side wall and did not extend all the way to the floor. Some access plates are also missing from the console side wall, however, in practice these were not always fitted. The A-36's dive brake control box and handle was mounted on the cockpit side wall directly above the rudder trim knob.

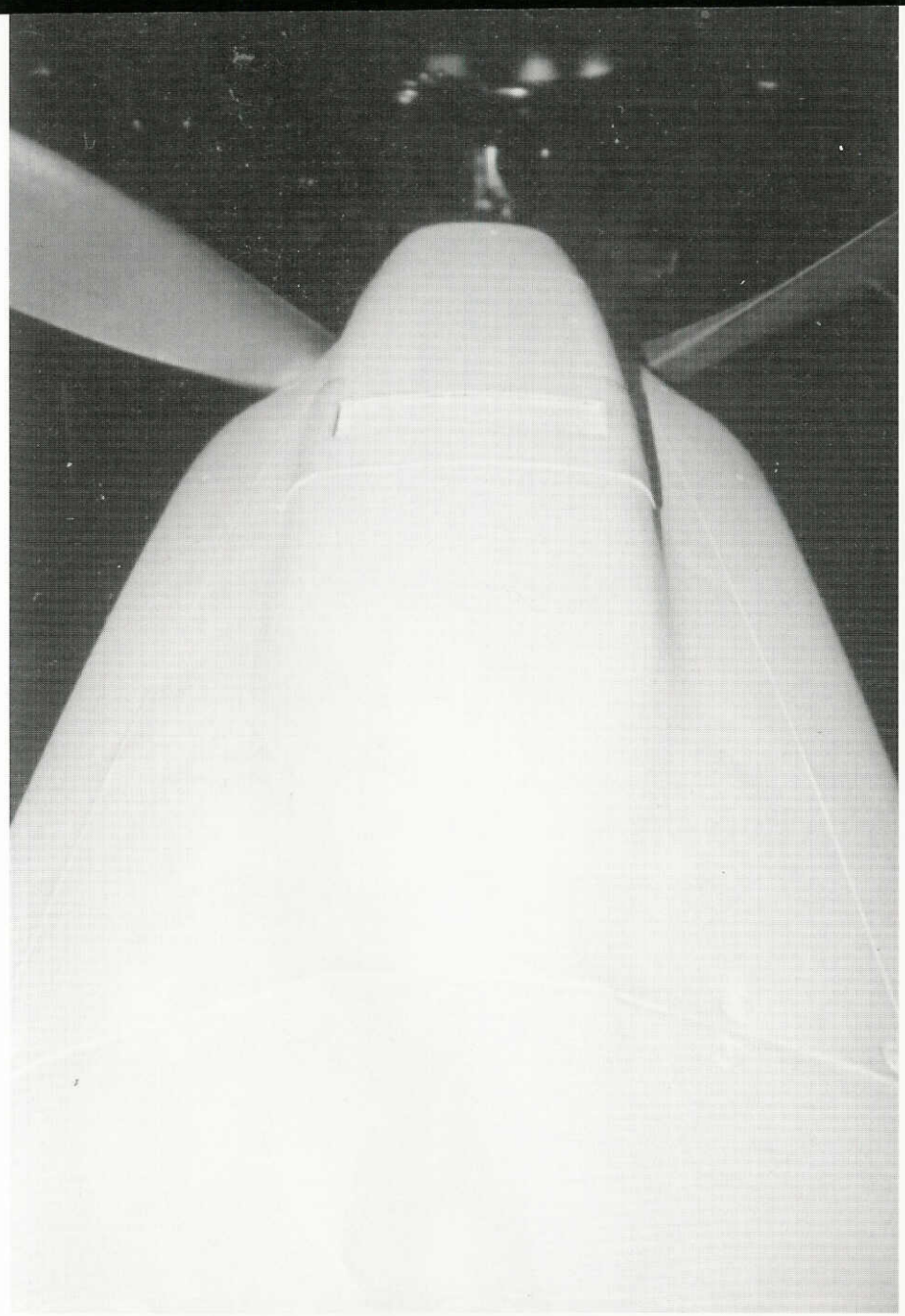
The upper clamshell and both canopy side panels could be jettisoned in one piece by pulling on the handle located on the right front sill of the cockpit. The handle was normally painted red.



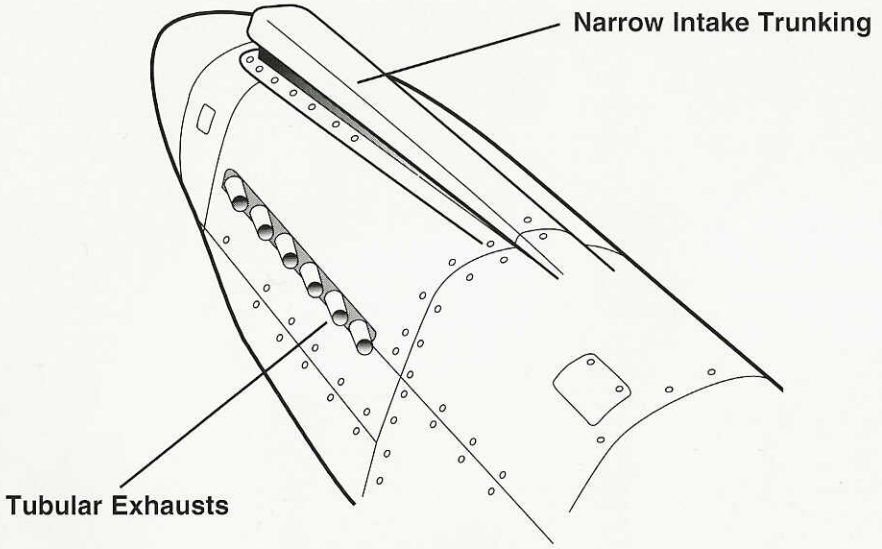


(Above) The space under the engine opens up when the guns and ammo boxes are removed. The oil pan slanted back to drain towards the oil pump. The A-36 received a new Allison V-1710 F-21R-87 engine. It was a sea-level rated engine originally used on the Lockheed P-38 Lightning (with turbosupercharging).

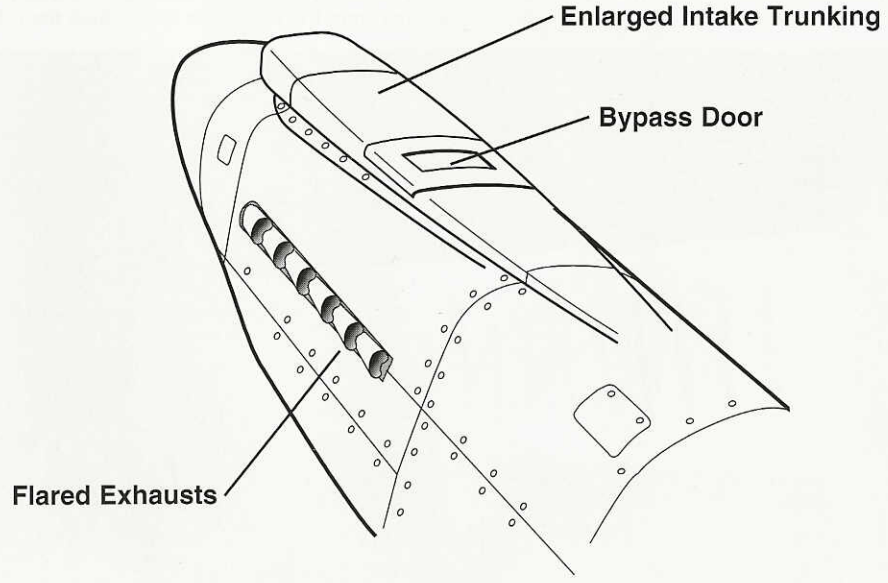
(Below) While power at low level was improved, power at higher altitudes was even worse than that of the P-51. However, due to the low level attack mission of the A-36, this was not deemed a problem. Next to the oil pump assembly is the circular housing of the coolant pump.



Operations in North Africa brought about the need for a carburetor air filtration system. A bypass door was incorporated into the now wider intake trunking which was controlled on demand by a knob and push rod assembly from the cockpit.

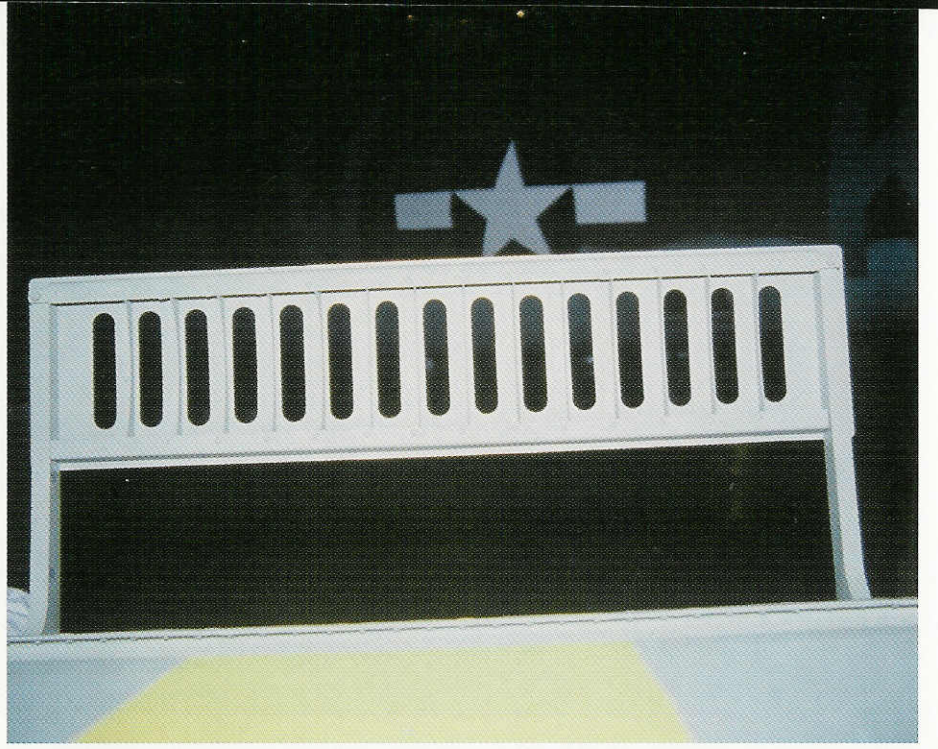


Mustang I/P-51



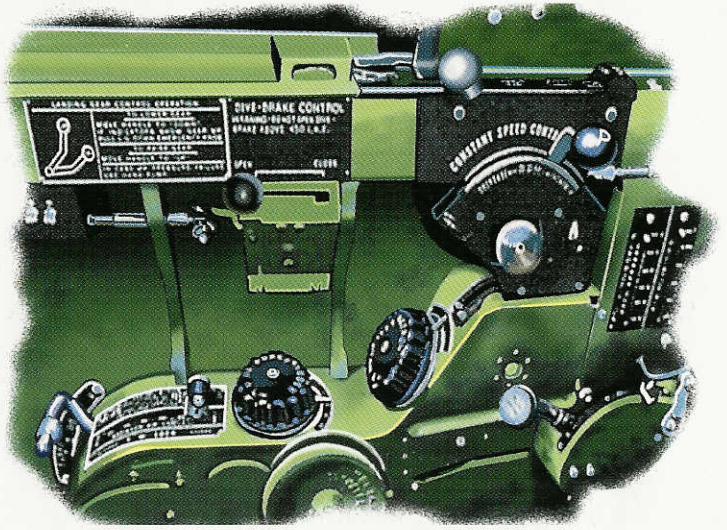
A-36 Apache

(Above Left) As a dive bomber the A-36 was simply too fast. Dive brakes on the upper and lower surface of the wings were used to slow the aircraft, however, near vertical dives as used by the Luftwaffe Stuka or the USN Dauntless were the exception rather than the rule.



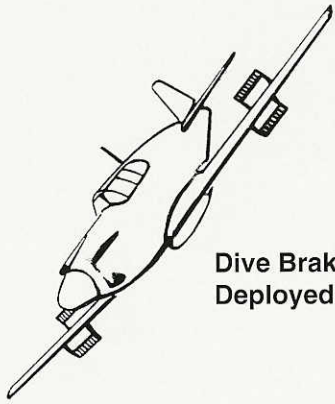
(Above) Each dive brake consisted of two arms and a slotted sheet metal fence with vertical reinforcing webs. The upper and lower dive brakes were interconnected.

A-36 Port Cockpit Sidewall

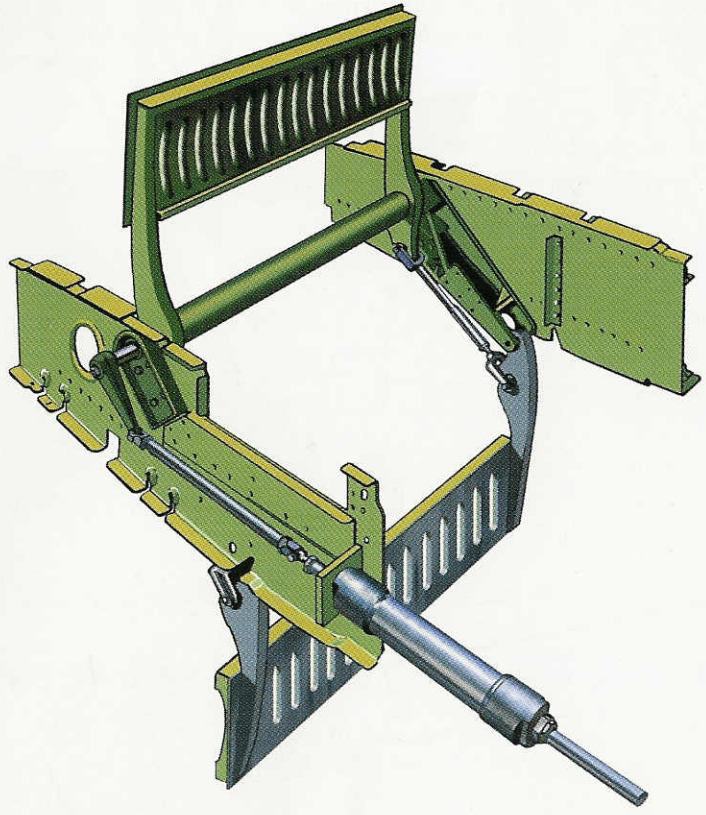


(Left)The upper dive brake retracted forward and it's smooth outer surface lay flush in the wing.

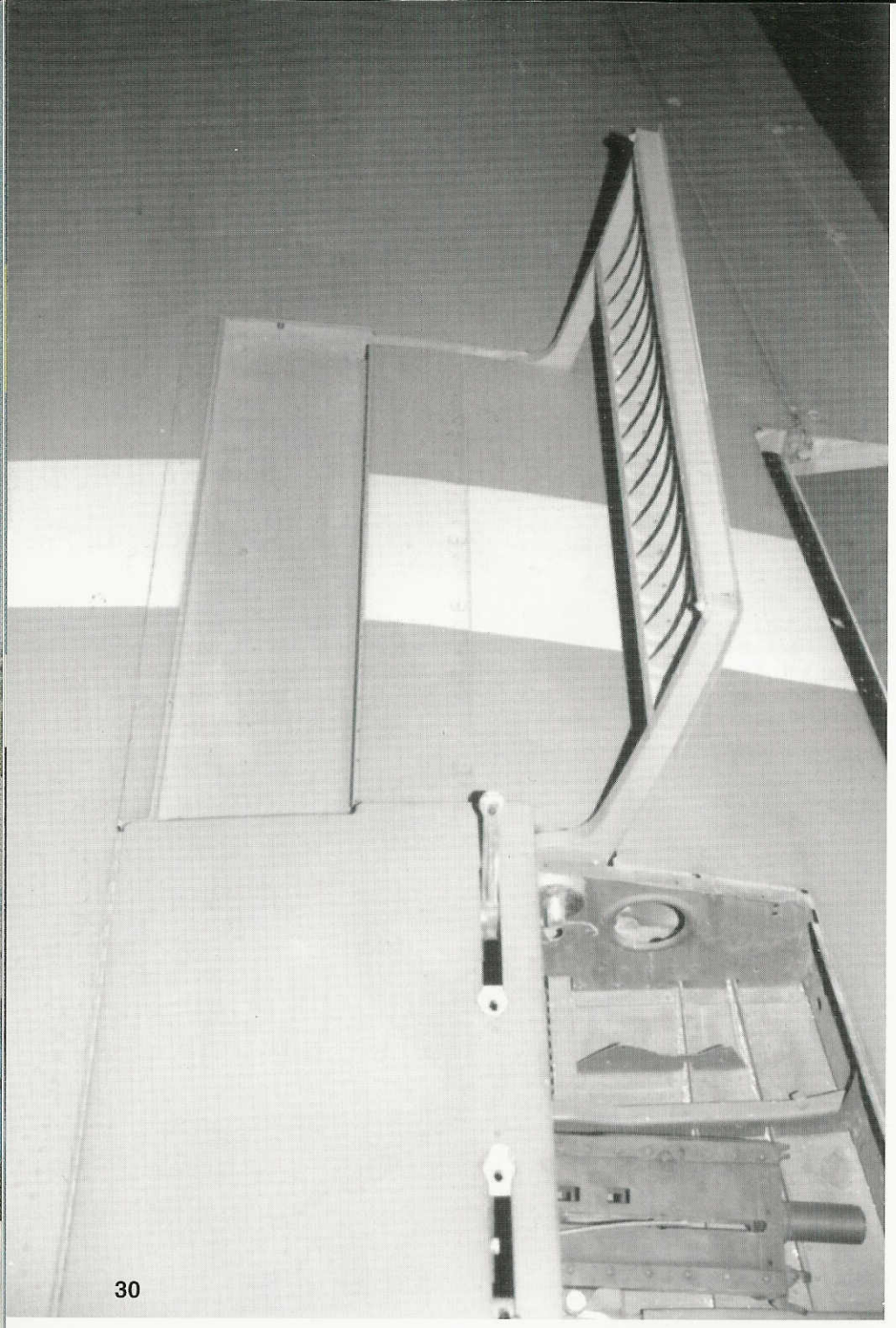
Dive Brakes

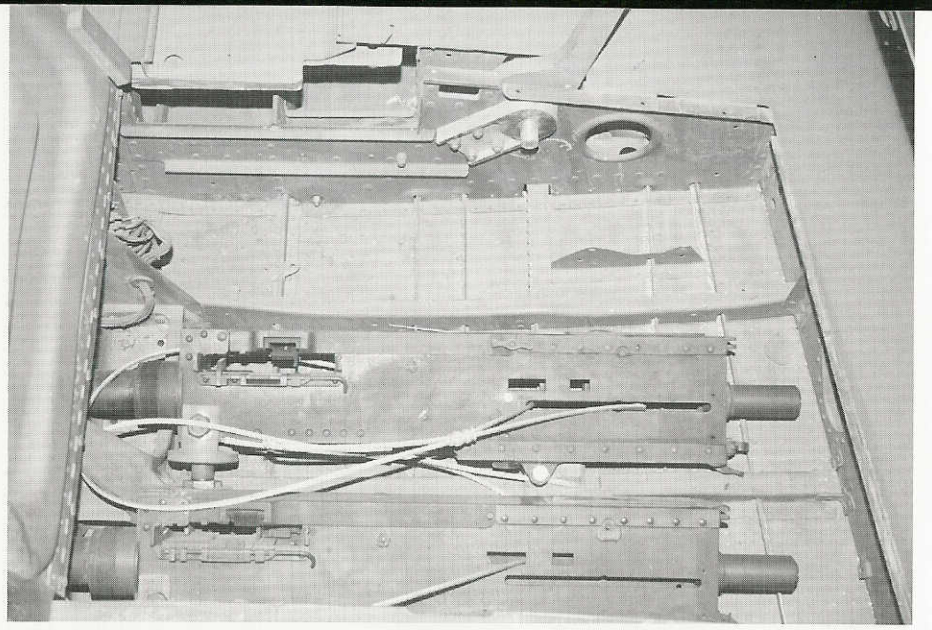


Dive Brakes Fully Deployed



The lower dive brake retracted to the rear and left the arms protruding slightly below the wing's surface. Each set of dive brakes was operated by a single hydraulic ram which, in the Mediterranean climate, was not always reliable. However, improved maintenance and pilot techniques dramatically increased the system's reliability.

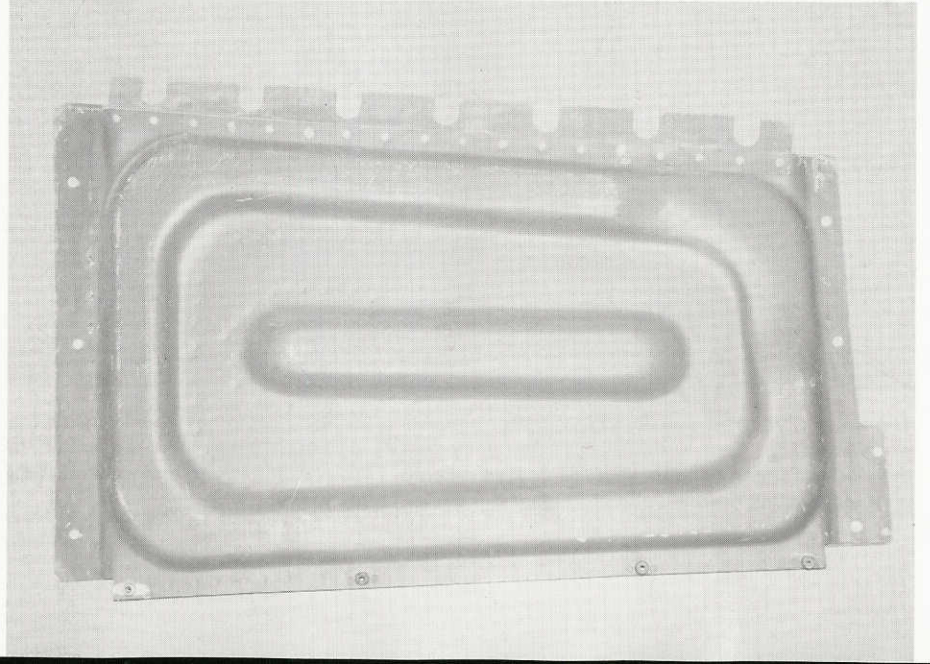


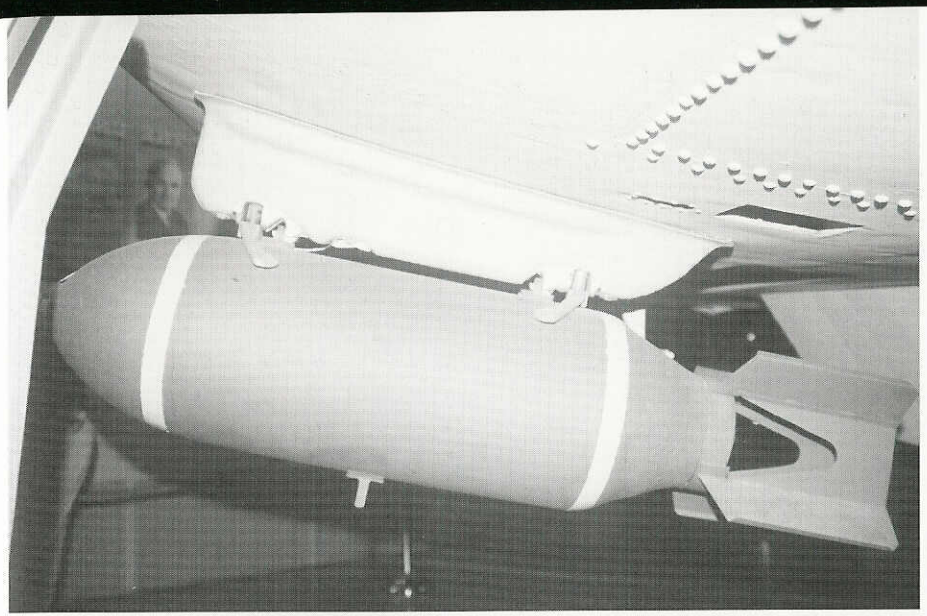


(Above) The A-36 brought about a further change in armament. A pair of .50 caliber machine guns were installed in each wing. The ammo boxes were under the dive brake wells. An additional pair of .50 caliber machine guns were placed in the nose using the same components as the Mustang I, although many A-36s flew without them.

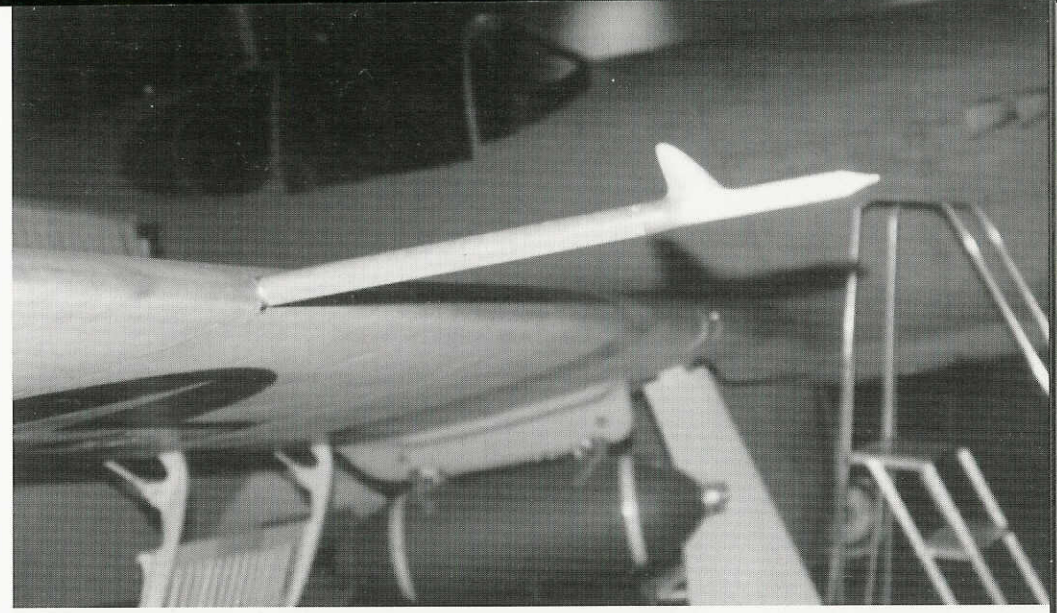
(Left) The upper wing dive brakes covered the ammo bays of the wing guns.

(Below) The gun bay access doors were also changed. Two separate covers were used. The front cover was hinged along the front edge and folded up and forward. The rear cover was simply held in place along its rear edge and the front cover locked in place over it. The inner face of the door was sculpted to provide strength and rigidity.



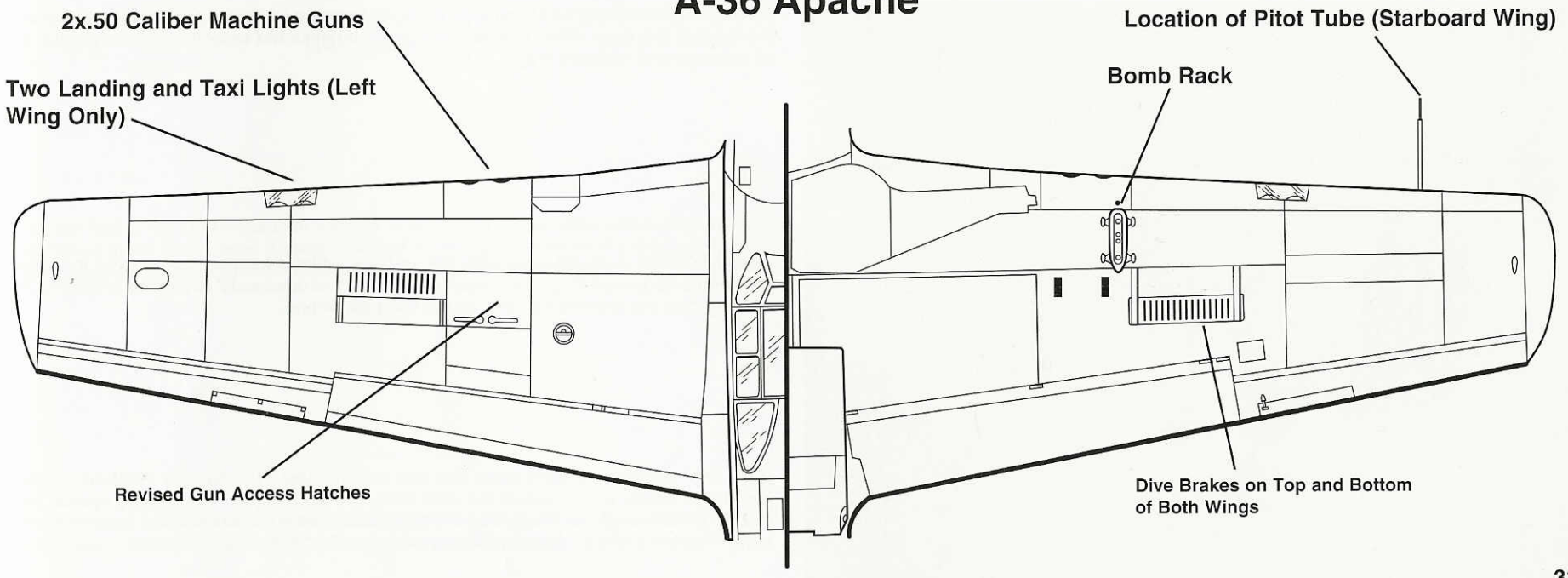


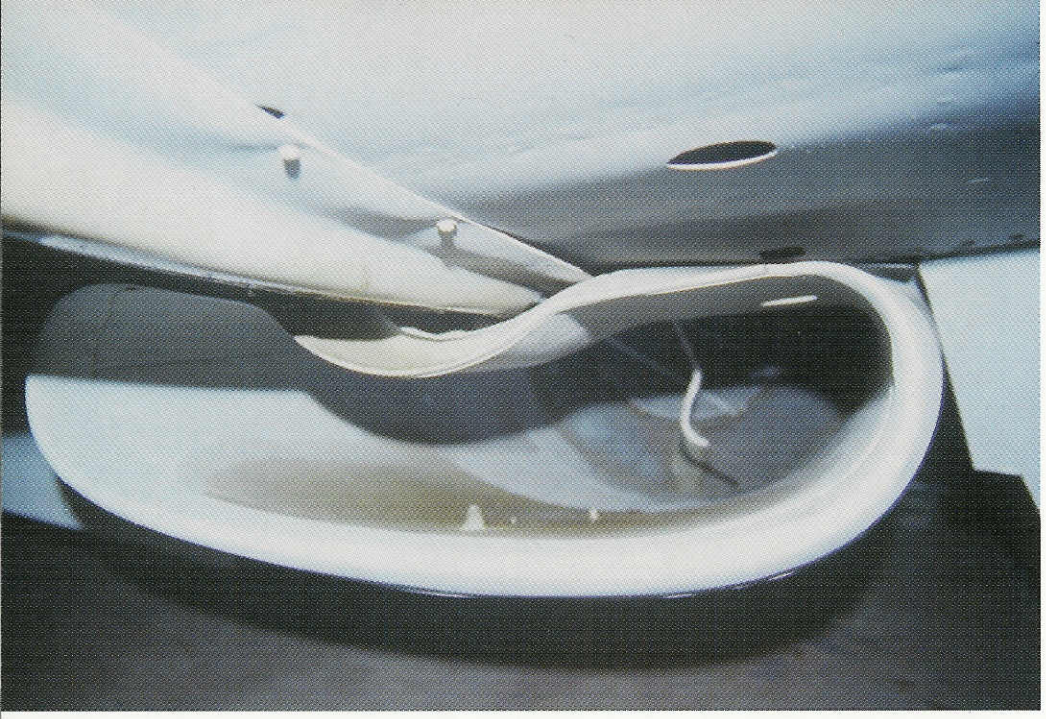
The A-36 was first the Allison-powered Mustang to carry releasable ordnance. The usual load was a pair of 500 lb. bombs, however 100 and 250 lb. bombs, a 325 lb. depth charge, or 588 lb. chemical smoke tanks could be carried. There was no provision for carrying external fuel tanks. This pylon is the wrong type for use on early Mustangs during WW II. The pylon is of the type fitted to P-51Ds

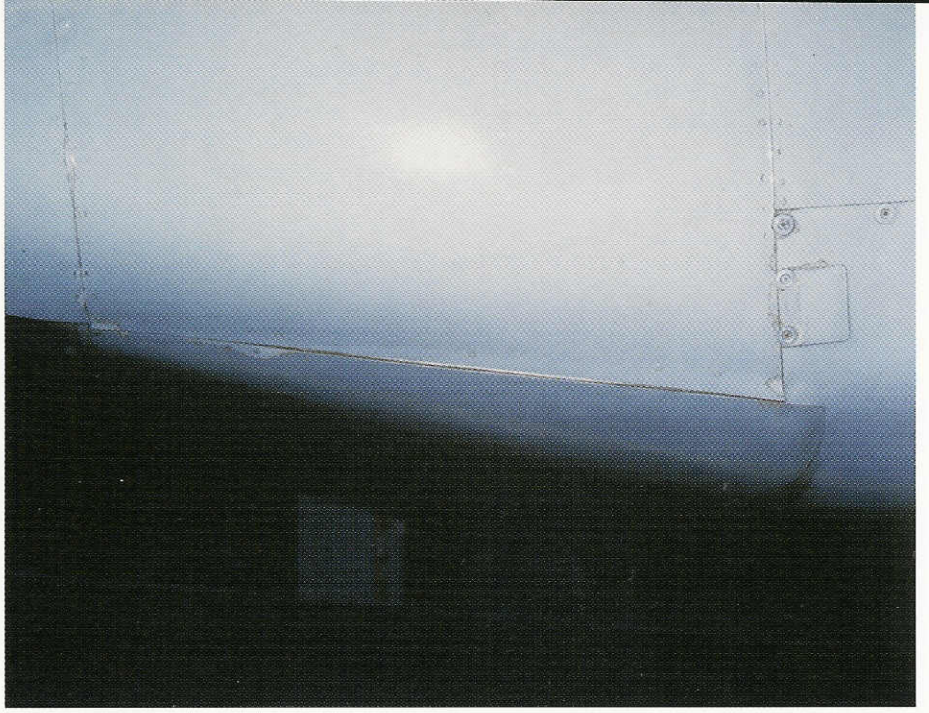


The A-36 was the only variant to have the pitot tube mounted in the wing leading edge. All others had an 'L' shaped tube hanging below the wing. All pitot tubes were mounted on the starboard wing.

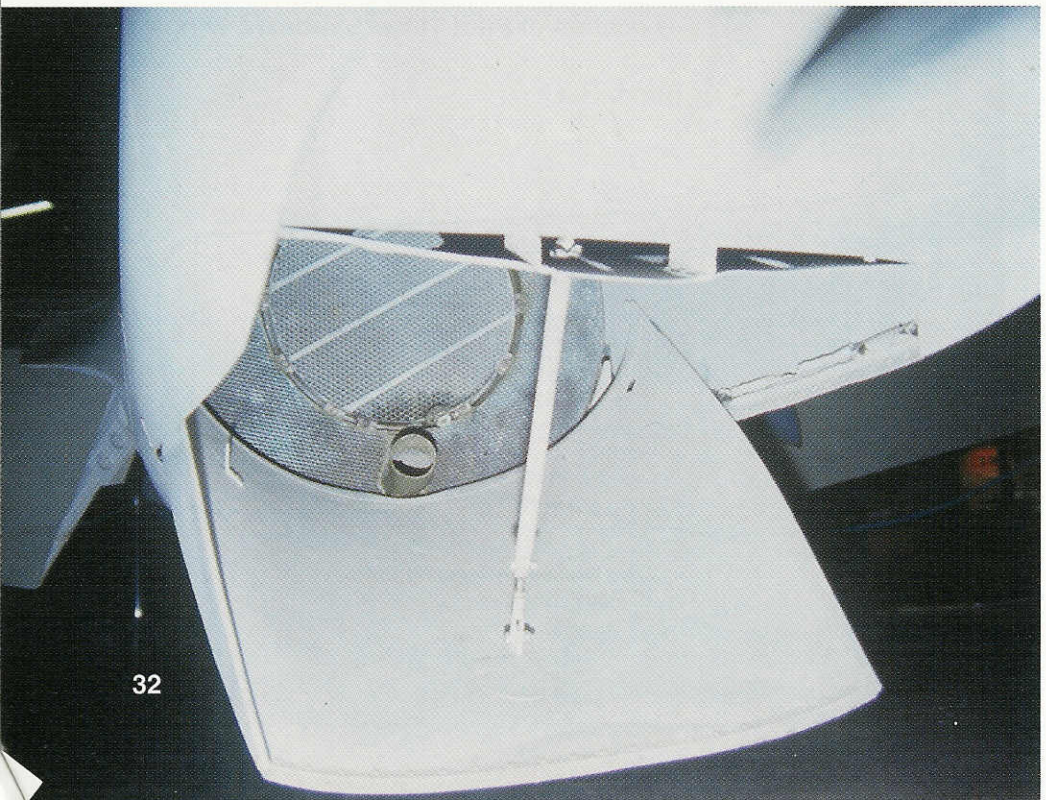
A-36 Apache


2x.50 Caliber Machine Guns
Two Landing and Taxi Lights (Left Wing Only)
Location of Pitot Tube (Starboard Wing)
Bomb Rack
Revised Gun Access Hatches
Dive Brakes on Top and Bottom of Both Wings





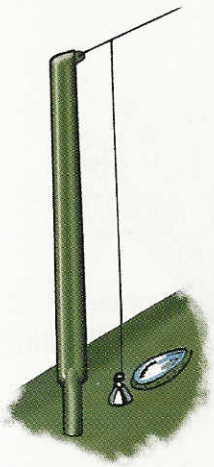
(Above) All Allison engined Mustangs shared a common radiator and oil cooler outlet with a moveable exit door. When closed, the door maintained the smooth contours around the aft fuselage and reduced drag.



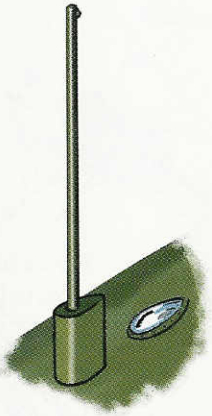
(Above left) The A-36 did away with the variable radiator inlet ramp and went to a fixed inlet with a larger opening. The upper lip was bulged downward to provide clearance for a fairing over the reinforcing strip on the wing centerline.

(Left) The radiator's variable outlet flap was not changed. The circular Prestone radiator and the oil cooler which formed the core were also unchanged. The cooling system held 12 U.S. gallons and was filled via a holding tank located in the extreme left nose of the aircraft. The front of the coolant tank was protected by 3/8 inch armor plate.

Antenna Masts

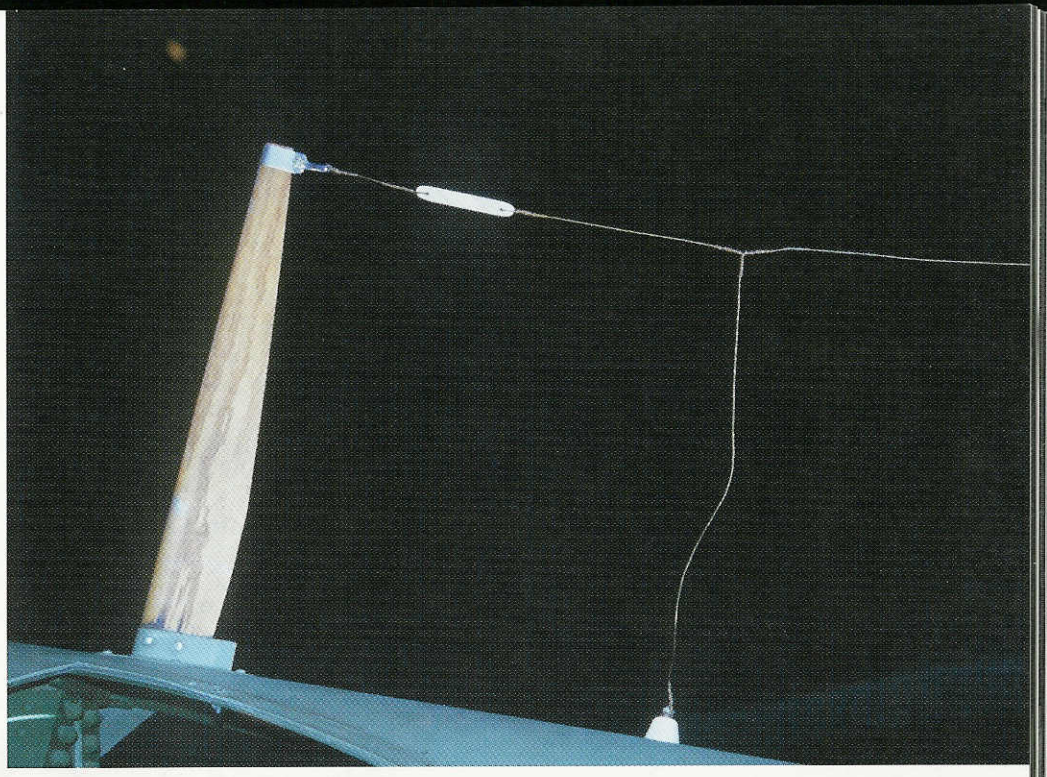


Mustang I, P-51, P-51A

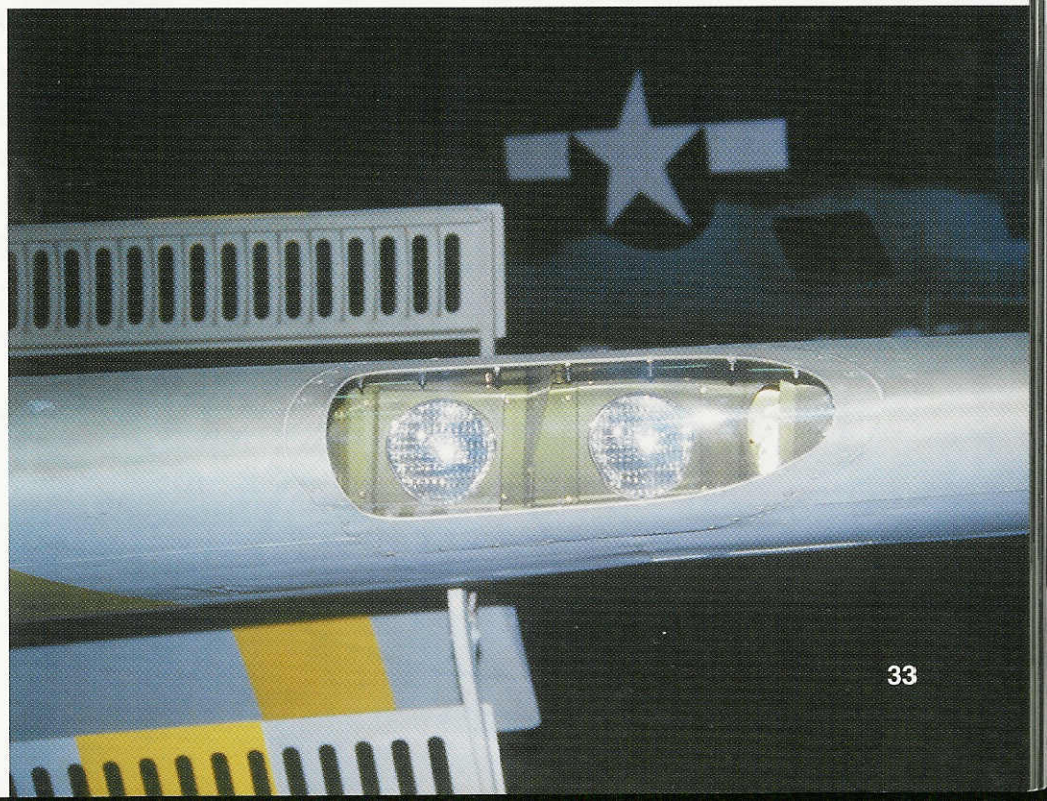


A-36 MTO (Mediterranean)

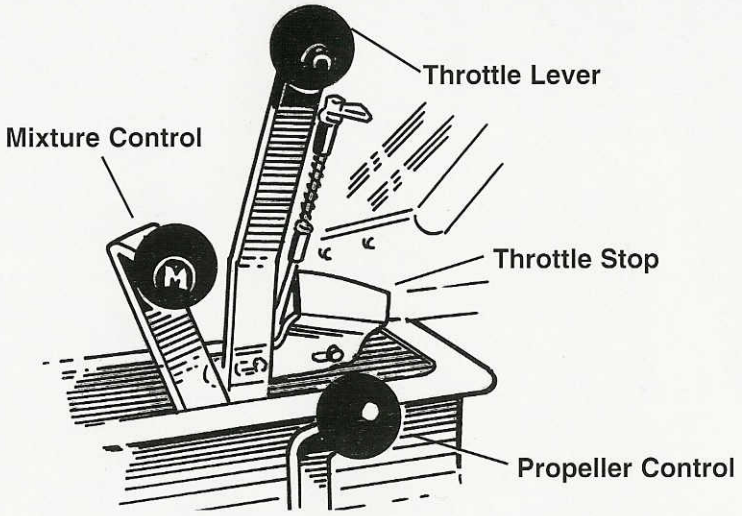
A-36 and P-51A



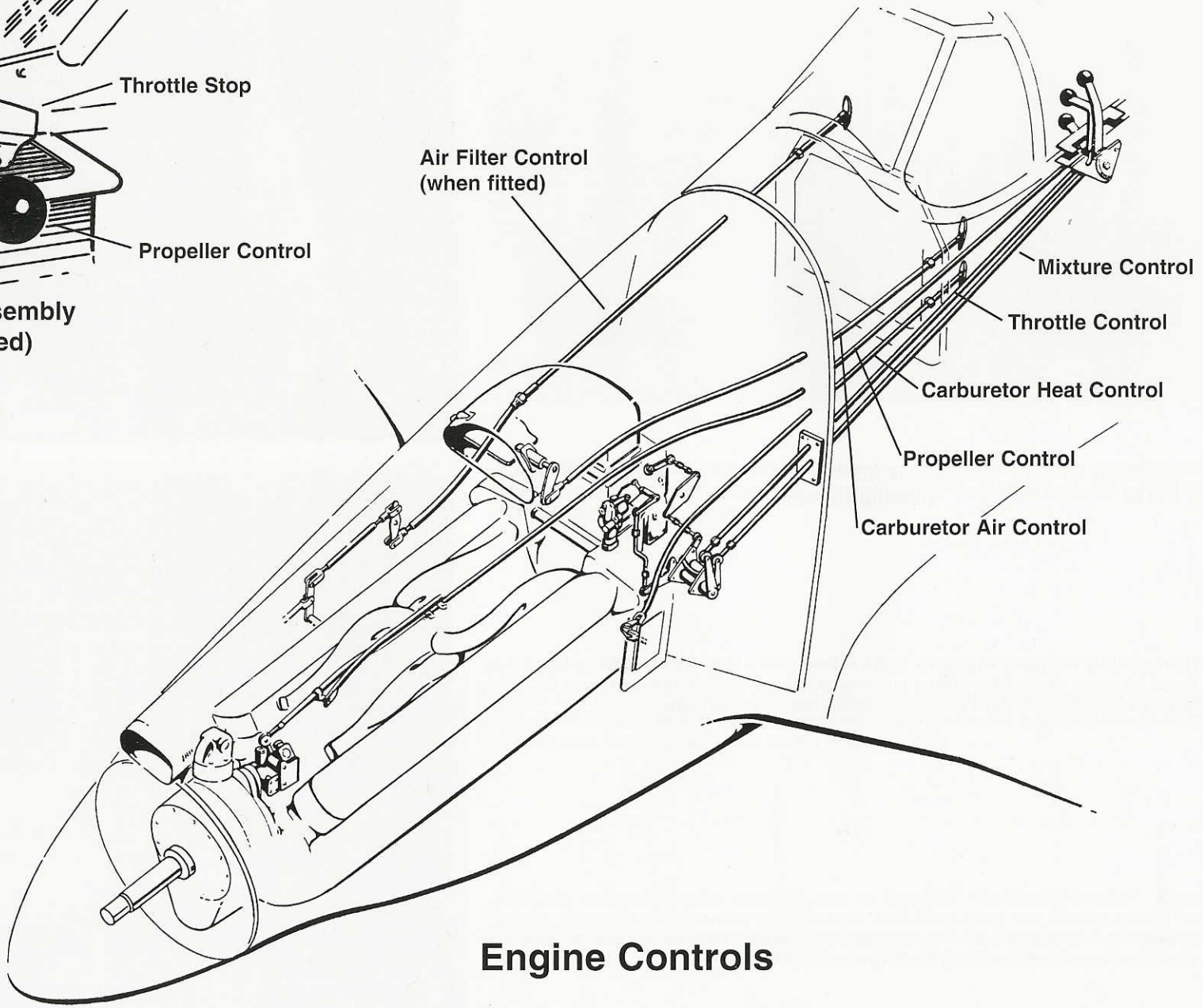
(Above Right) The USAF Museum's A-36A is fitted with a later style wooden antenna mast found on many of the later Allison powered Mustangs as well as P-51Bs and Cs. They were normally painted Olive Drab to match the rest of the airframe.



(Right) The A-36 also saw a further revision to the landing and taxi lights which were now combined into a single housing on the port wing leading edge.

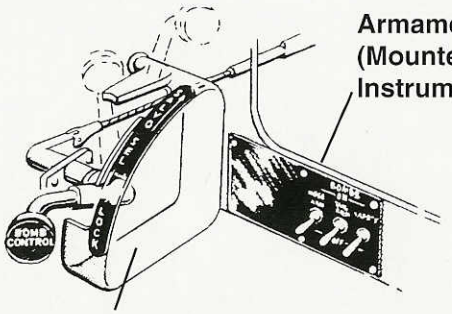


Throttle Assembly
(Reversed)

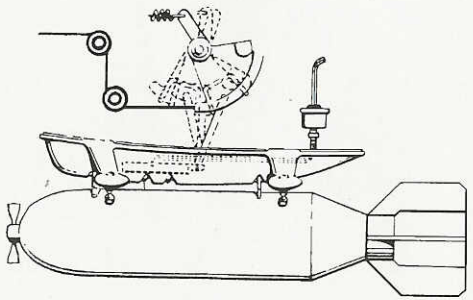


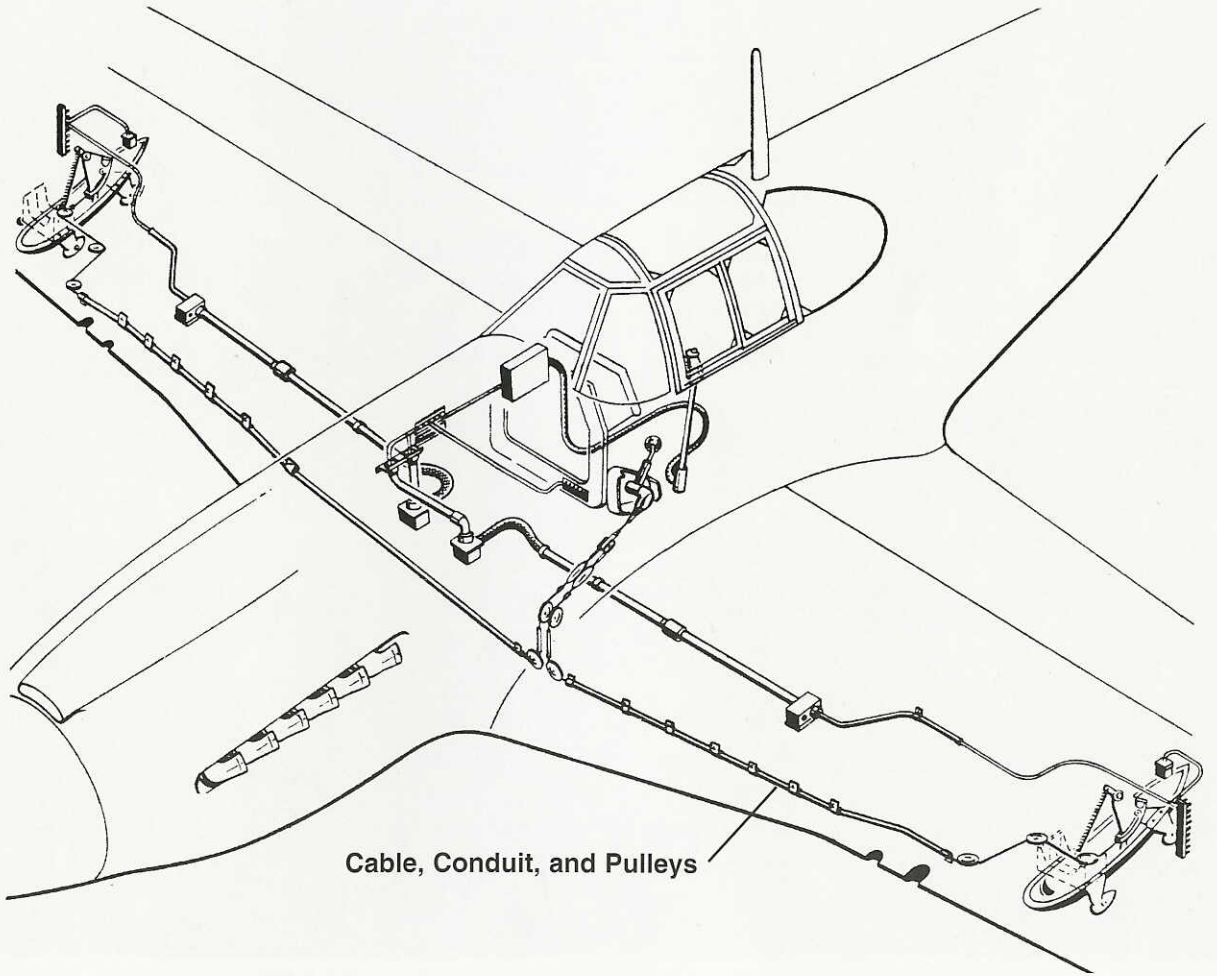
Engine Controls

Bomb Control Panel (Reversed)


Armament Switch Panel
(Mounted on Lower Left
Instrument Panel
Bomb Quadrant and Control Lever
(Mounted on Front of Left Console)

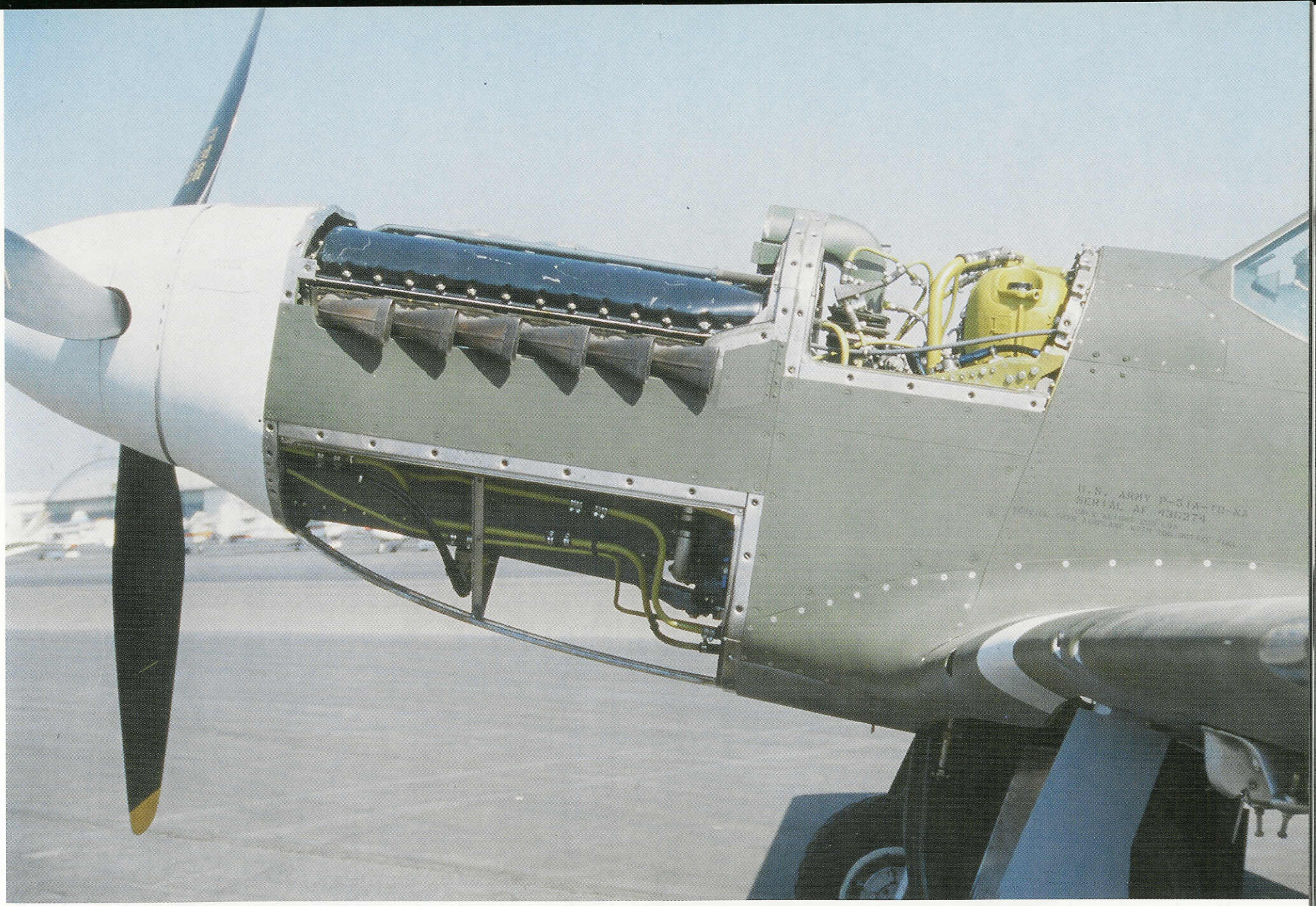
Bomb Rack





Bomb Controls
A-36/P-51A

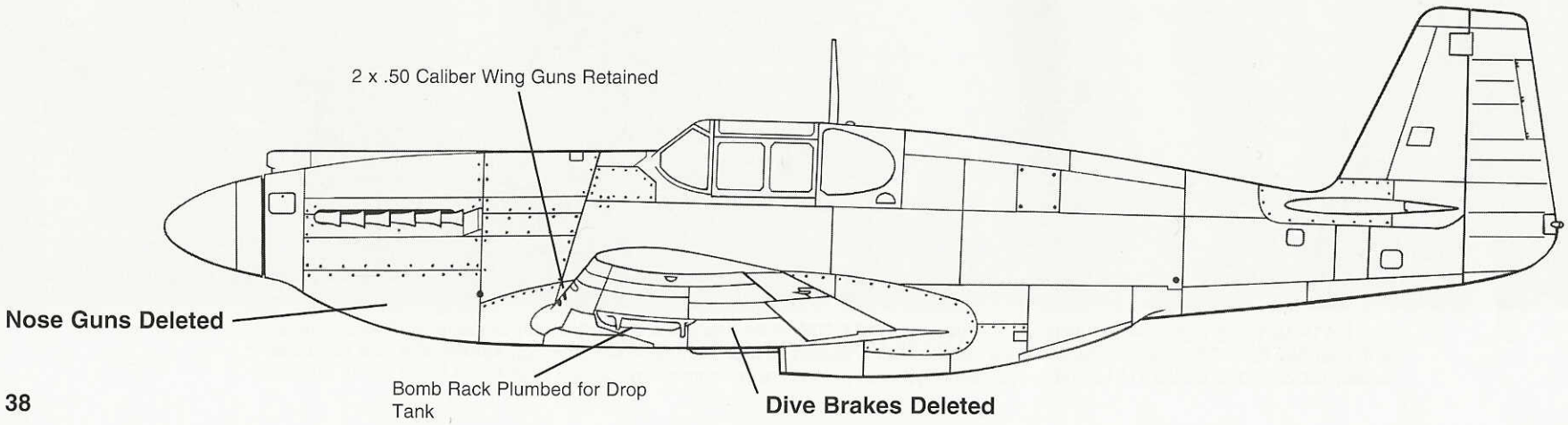
The P-51A at the Yanks Air Museum in Chino, CA is air worthy and is probably the single finest example of an Allison-engined Mustang in the world today.



The P-51A Mustang was powered by the new Allison V-1710 F-20R-81 engine and a 10'9" diameter propeller with wider blades and rounded tips. The new engine and prop resulted in an improved rate of climb and higher top speed. The new prop was widely retrofitted to earlier P-51s and A-36s. Both types of propellers were made by Curtiss Electric.

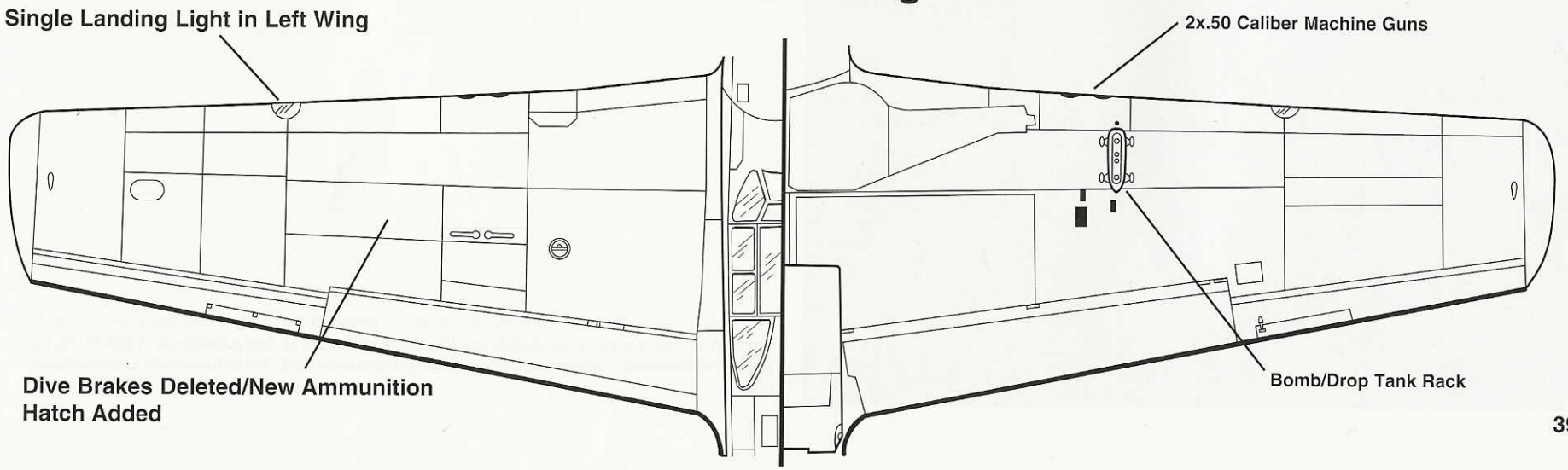
Mid-1943 saw the introduction of the P-51A into combat operations, specifically the China-Burma-India (CBI) Theater. Slightly over 300 were built — about 50 going to the RAF with the remainder split between USAAF combat units and advanced fighter training units (SDAM)

P-51A

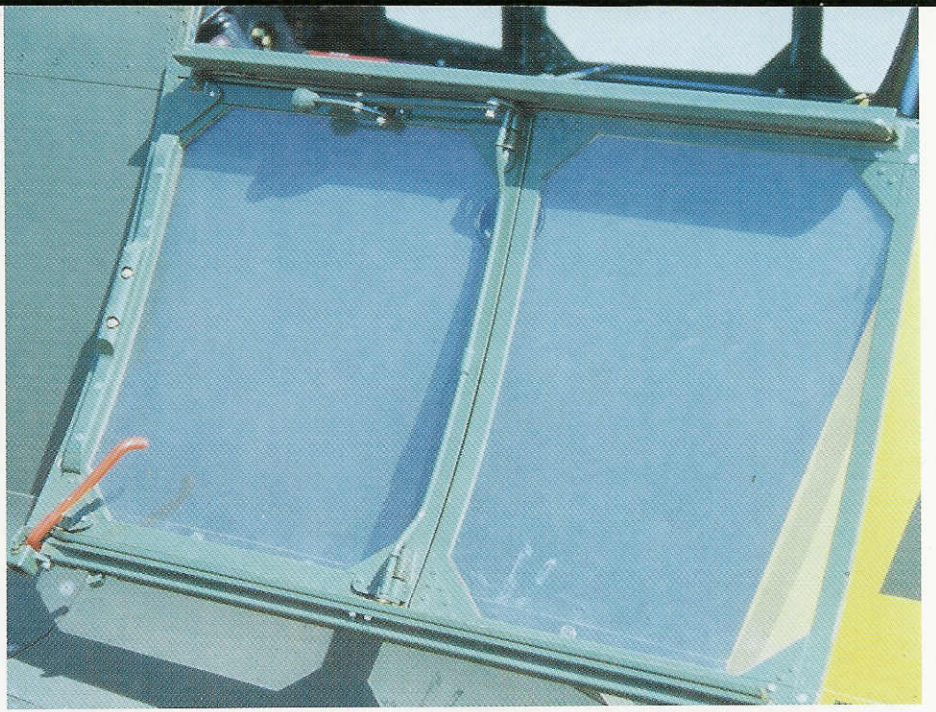


The 1st Air Commando Group operating out of northeastern India established a well deserved reputation for hard combat in the CBI. Their unique markings of five diagonal stripes over the aft fuselage was a common sight. P-51As were the first Mustang variant to be fitted with drop tanks. Many P-51As were fitted with a vent window in the left front panel of the windscreen. CBI based Mustangs were also usually fitted with a DF loop on the fuselage spine — not surprising considering the expanse and type of terrain over which they were flying. (USAFM)

P-51A/Mustang II

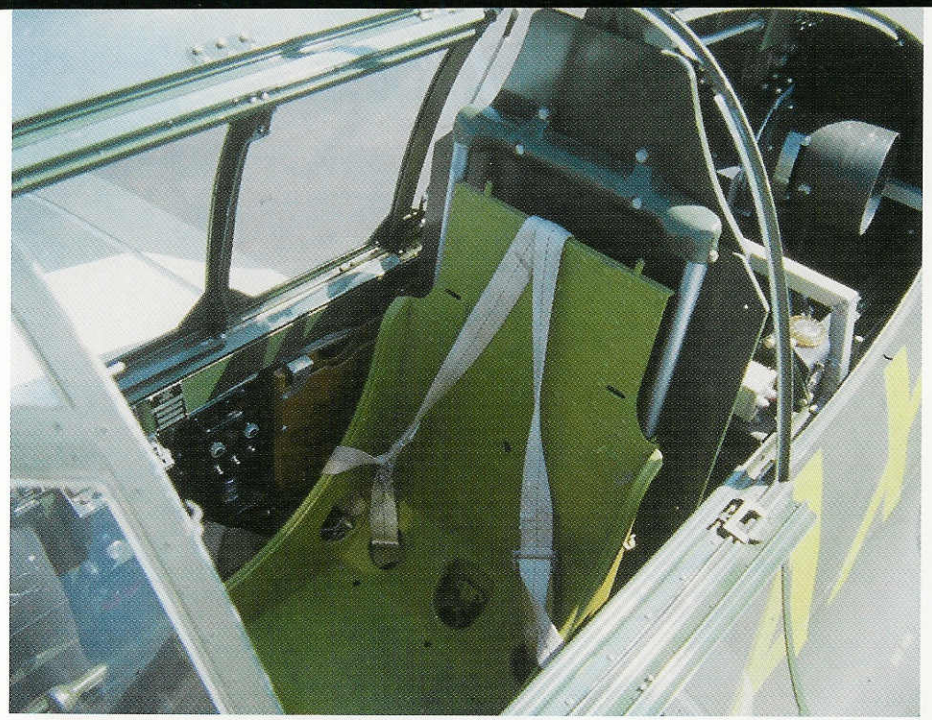

Single Landing Light in Left Wing
2x.50 Caliber Machine Guns
Dive Brakes Deleted/New Ammunition Hatch Added
Bomb/Drop Tank Rack

The upper canopy clamshell panel was very simple. It consisted of light framing and a single curved piece of perspex. It formed an interlocking unit with...



...the port side panel of the canopy. The panel locking handle was in the upper front corner of the door. The front window of both the port and starboard canopy panels could be unlocked and slid to the rear. The locking mechanism was at sill level.

The rear quarterlights were simple pieces of perspex formed to the contour of the fuselage. An elastic chord provided tension on the latches to keep them from vibrating open. The view from the cockpit would be greatly improved with the introduction of the Malcolm hood.



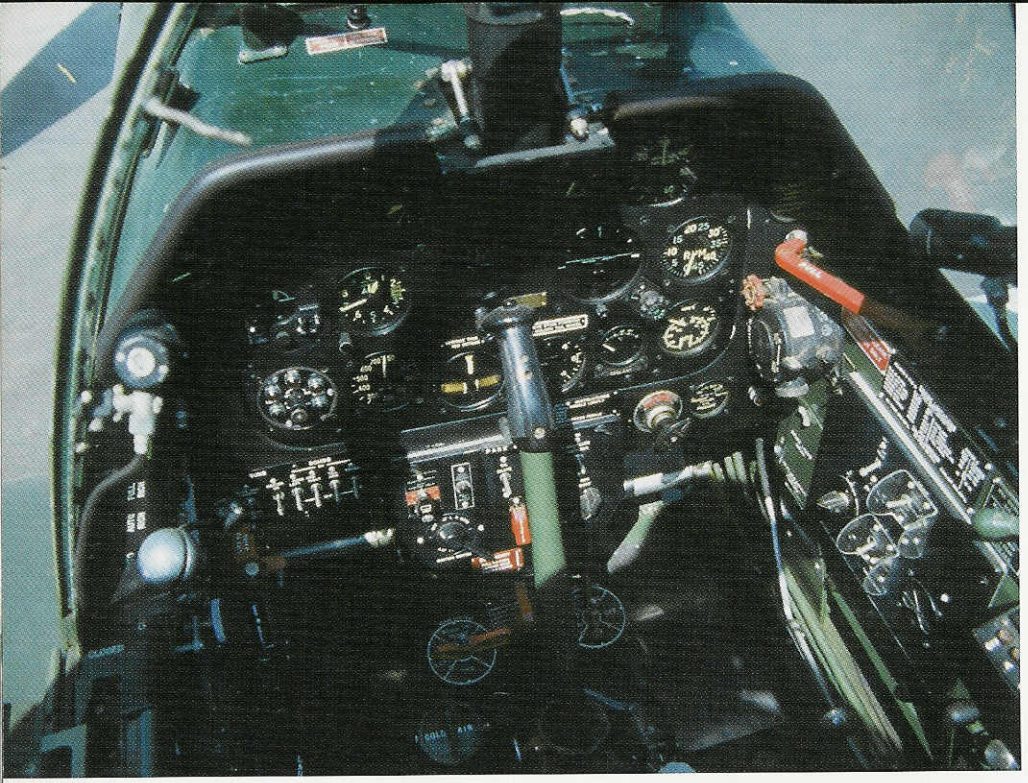
(Above) Both rear quarterlights could be unlatched at their front corners and removed to provide access to the rear cockpit area. Early Mustangs lacked a traditional headrest, so a canvas first aid pouch was often mounted on the head armor plate.

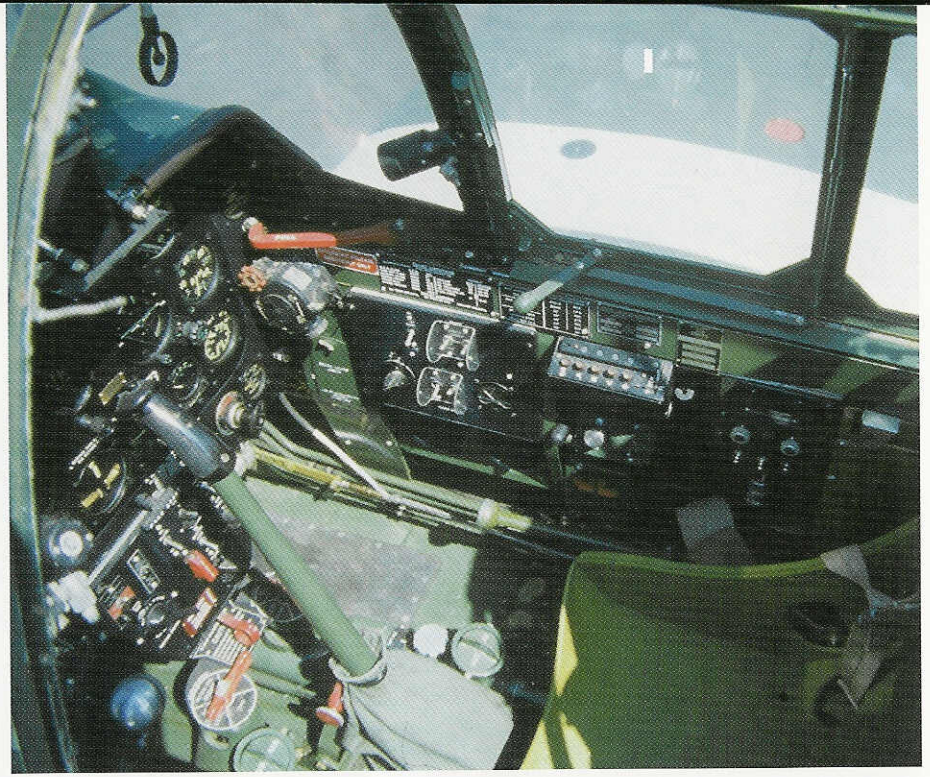
(Above) The windscreen consisted of three perspex panels and a single piece of 1.5" armor glass. Triangular demisters were placed on each side of the instrument panel shroud.

(Right) Inside the windscreen is the rear view mirror and auxiliary ring sight. The ring sight could be removed and clipped to the instrument panel shroud. There was no externally mounted bead sight for use with the ring sight.

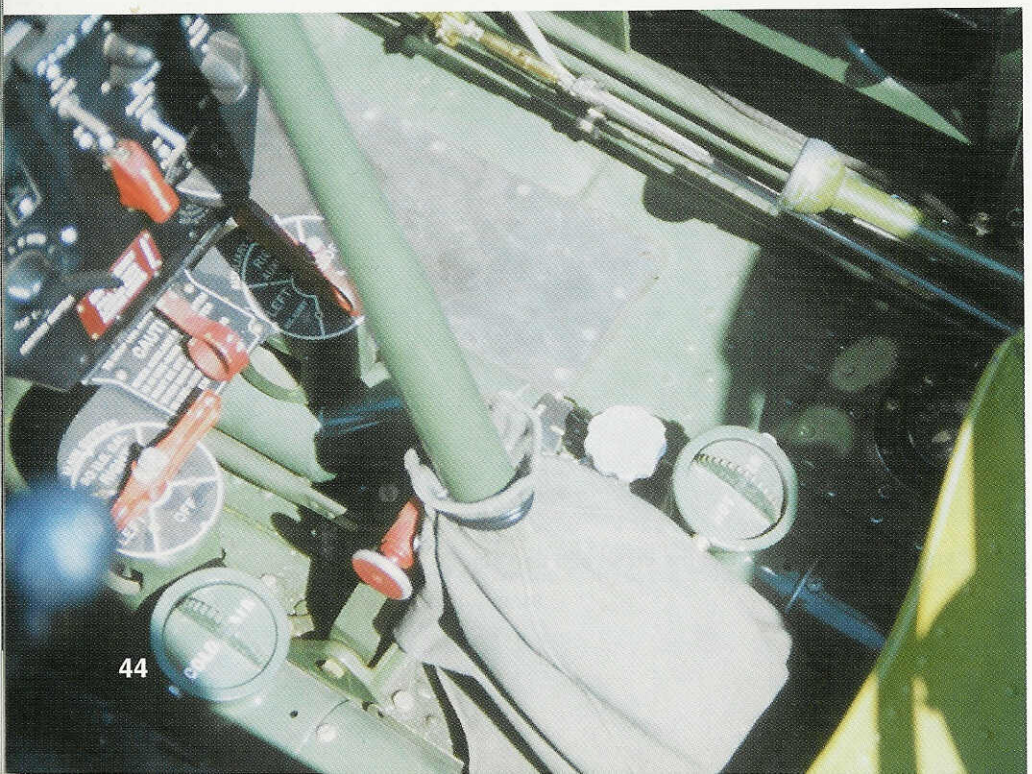
Looking directly into the K-24 camera mounted in the rear quarter light. The camera points slightly down and aft of the wing. The small hole in the aft fuselage near the 'H' is for a jacking bar. The small aft facing scoop on the fuselage side just above the star covers the entry hole for the IFF antenna and is now used to vent the cockpit and aft fuselage — it is not standard.

The K3A reflector gunsight rested in a notch in the instrument panel shroud. This sight lacks the crash pad and sun filter as well as it's mount.





(Above) The starboard cockpit side wall had the oxygen regulator moved to the front corner and there was minor rearranging of the switches in the electrical boxes.



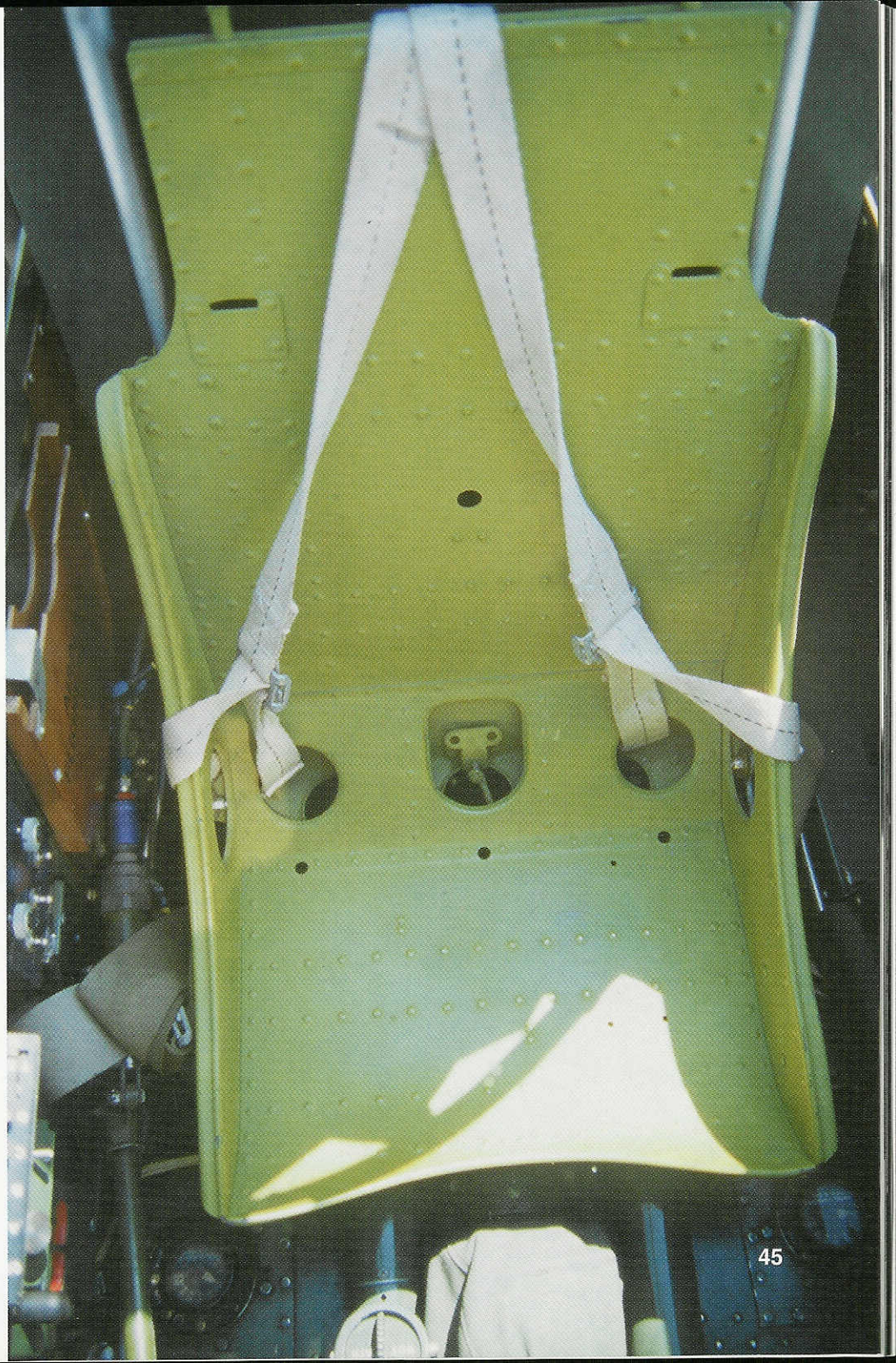
(Above Left) The cockpit arrangement remained fairly constant throughout the life of the series. A cockpit illumination light was fitted to both sides of the windscreen's rear frame. The angled box in the center of the starboard side wall is a modern radio.

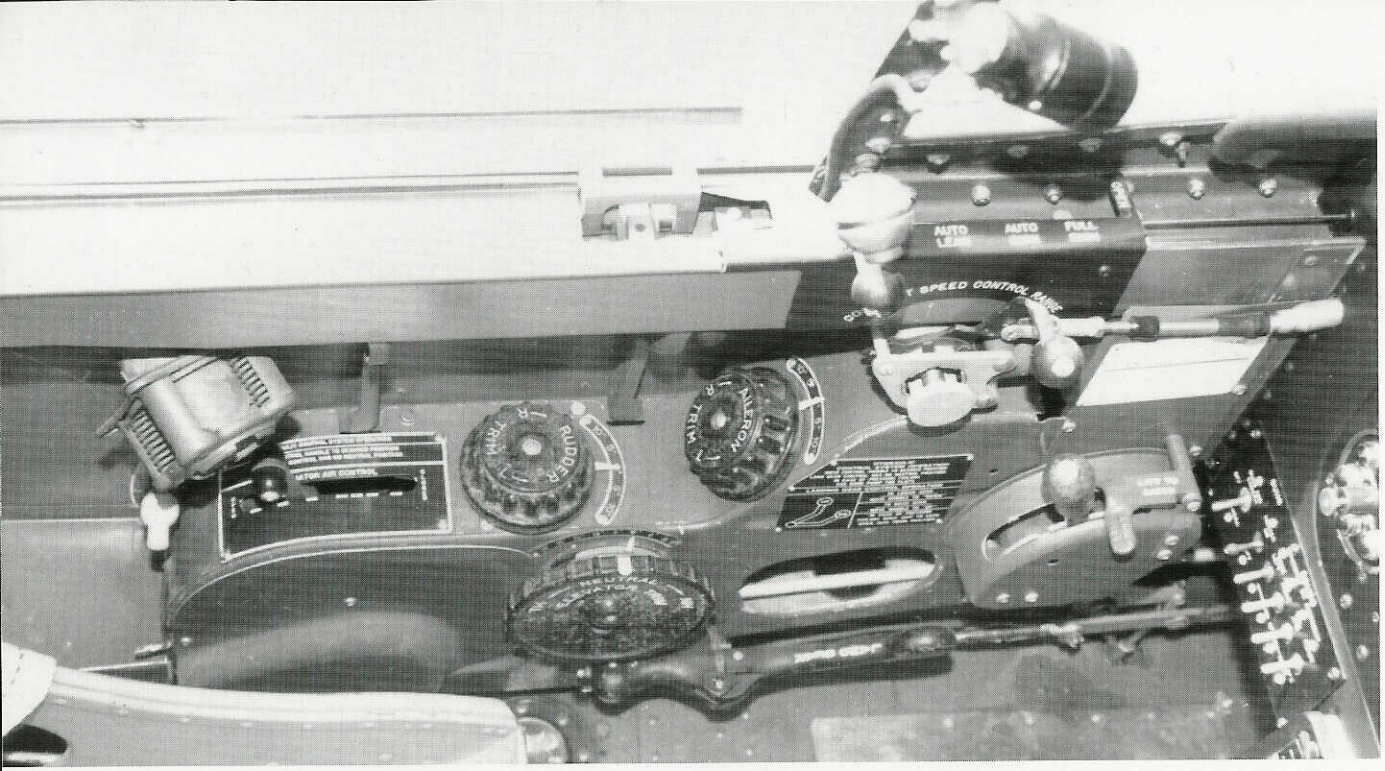
The cockpit floor began to get crowded. An auxiliary fuel system control knob was added to the right of the existing knob, and despite the Mustang's reputation for a hot and noisy cockpit, a hot air inlet was added to the right of the stick. The red control stick locking pin has been engaged, locking the stick forward and the elevators slightly down.

Reconnaissance variants of the Mustang used a K-24 camera mounted in the aft cockpit section and angled out to the left and to the rear in order to clear the wing trailing edge. The camera control box was mounted on the right upper front corner of the instrument panel. An additional camera could be mounted in a compartment between the radiator exit flap and the tail wheel.

Wooden Seat

Although a few minor details differed, the seat was largely unchanged in its size and shape. A hydraulic pump and handle are visible to the right of the seat. A small lever on the right front corner of the seat adjusted the height, while another on the left adjusted shoulder harness tension.



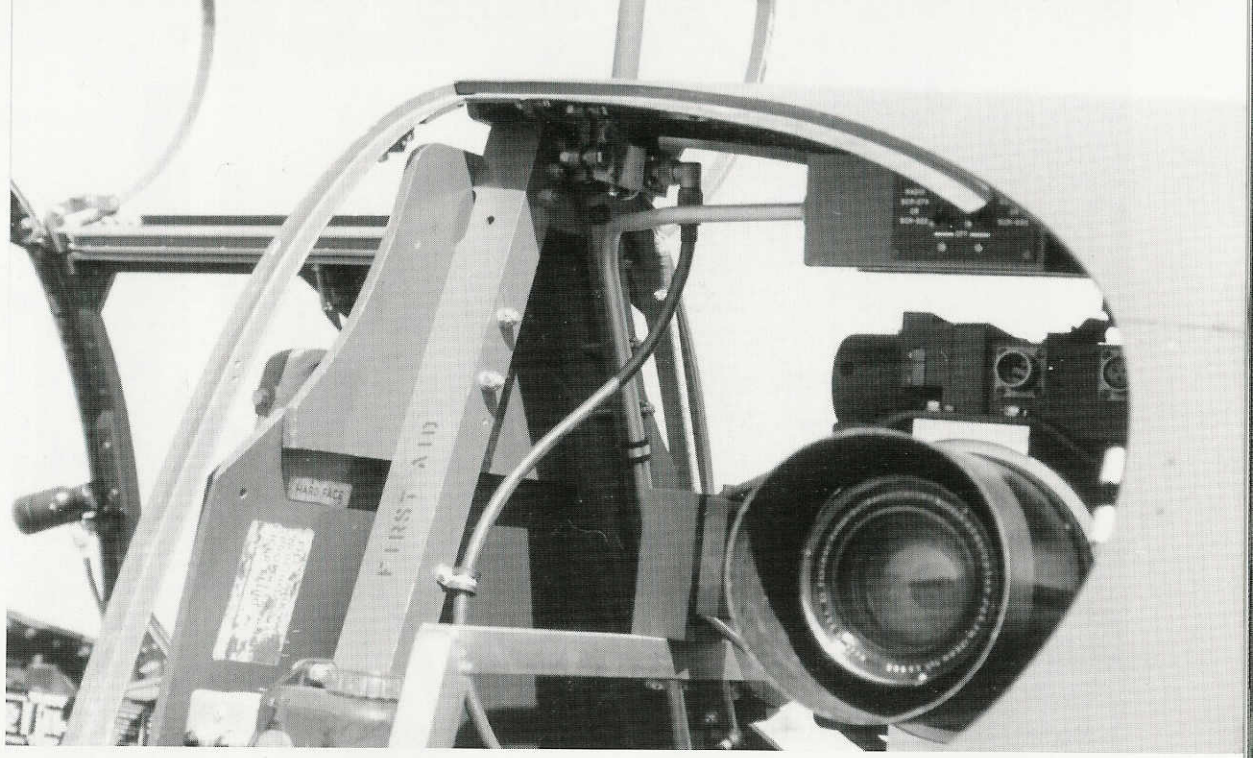


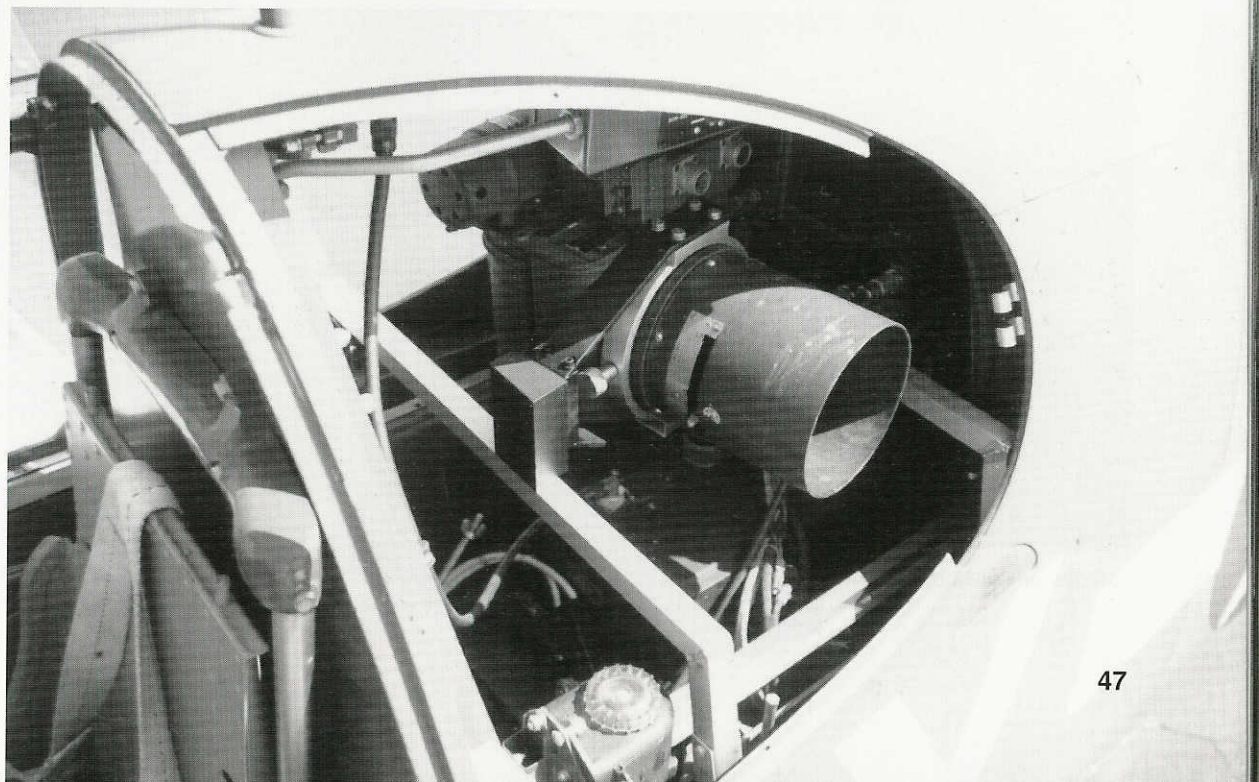
A flare pistol mount was added to the port side wall. The bomb release housing, added for the A-36 (below and slightly forward of the throttle quadrant) was now used to release the drop tanks as well. Engine control rods and cables are visible along the side wall in front of the upper console.

The starboard sill was covered with data placards. From left to right, they are an Emergency Enclosure Release placard, Engine Limitations placard, Landing Gear and Flaps Flight Limitations placard, the Manufacturers Data Plate, and a USAAF Data Plate. The oxygen regulator is on the sidewall at the far left. The electrical control panel is next, followed by the radio control boxes. The angled box is the face of the SCR-522 radio control box. To it's right is the SCR-535 radio control box. The box with the oval depressions in the face is the radio destruct control box. The depressions were often painted red.

The seat was backed with 3/8" armor plate, while the headrest was backed with 7/16" armor plate.

Reconnaissance Camera Control Box



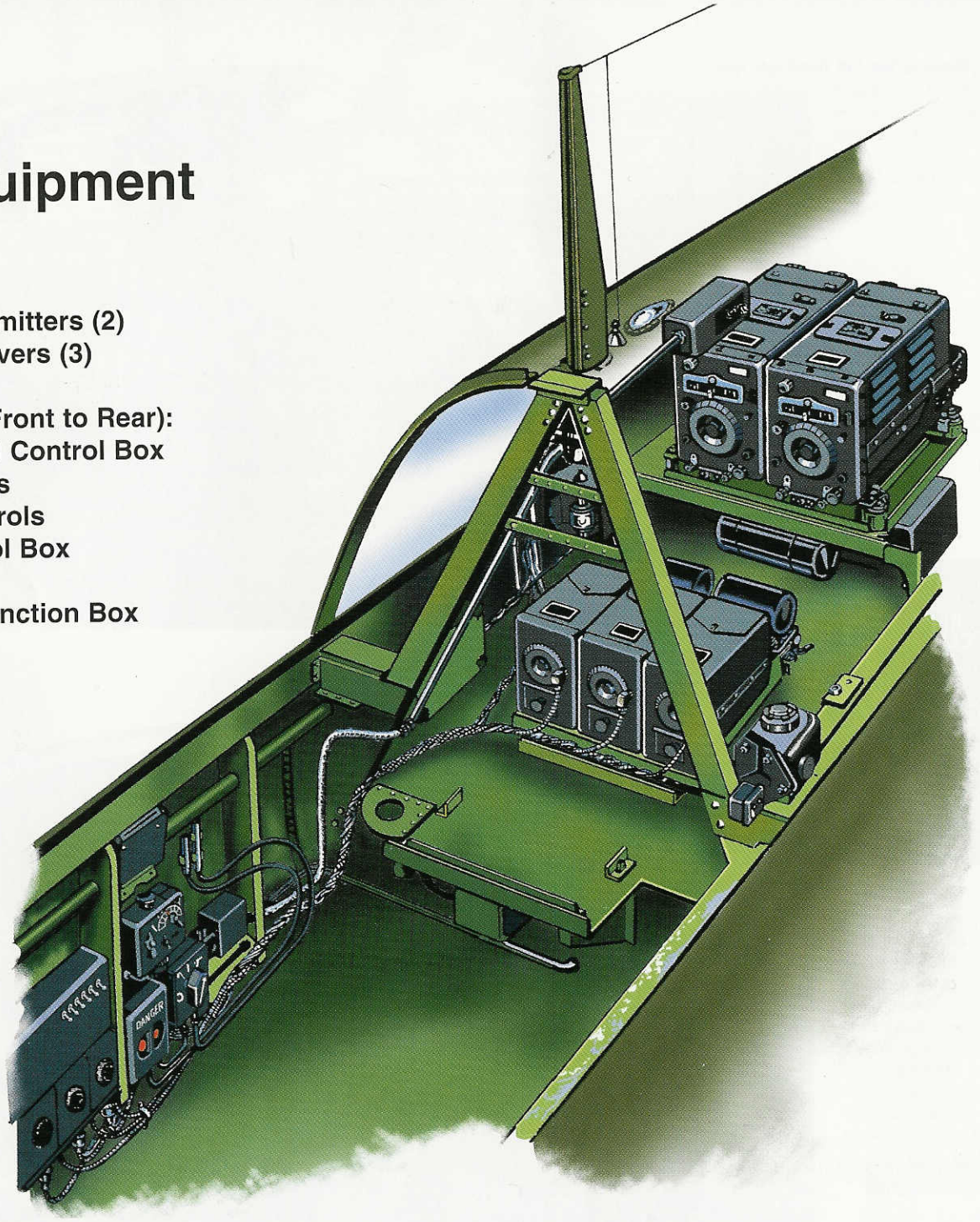


The camera, it's associated electrical equipment, and mount were easily accessible by removing the rear quarterlights.

Radio Equipment

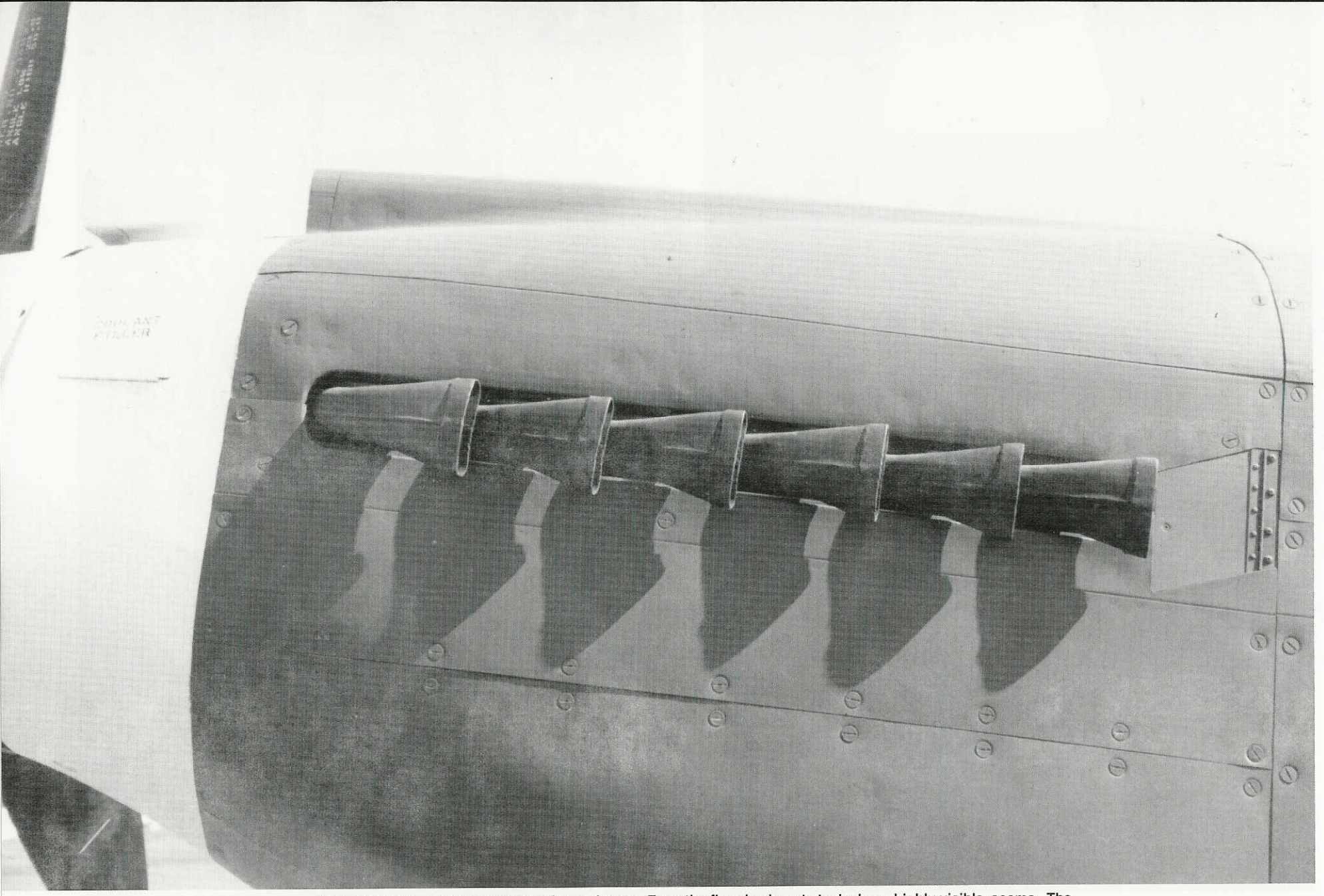
Upper Shelf: Transmitters (2)
Lower Shelf: Receivers (3)

Cockpit Sidewall (Front to Rear):
- Aircraft Electrical Control Box
- Receiver Controls
- Transmitter Controls
- Detonator Control Box
- Switch Box
- Power Supply Junction Box

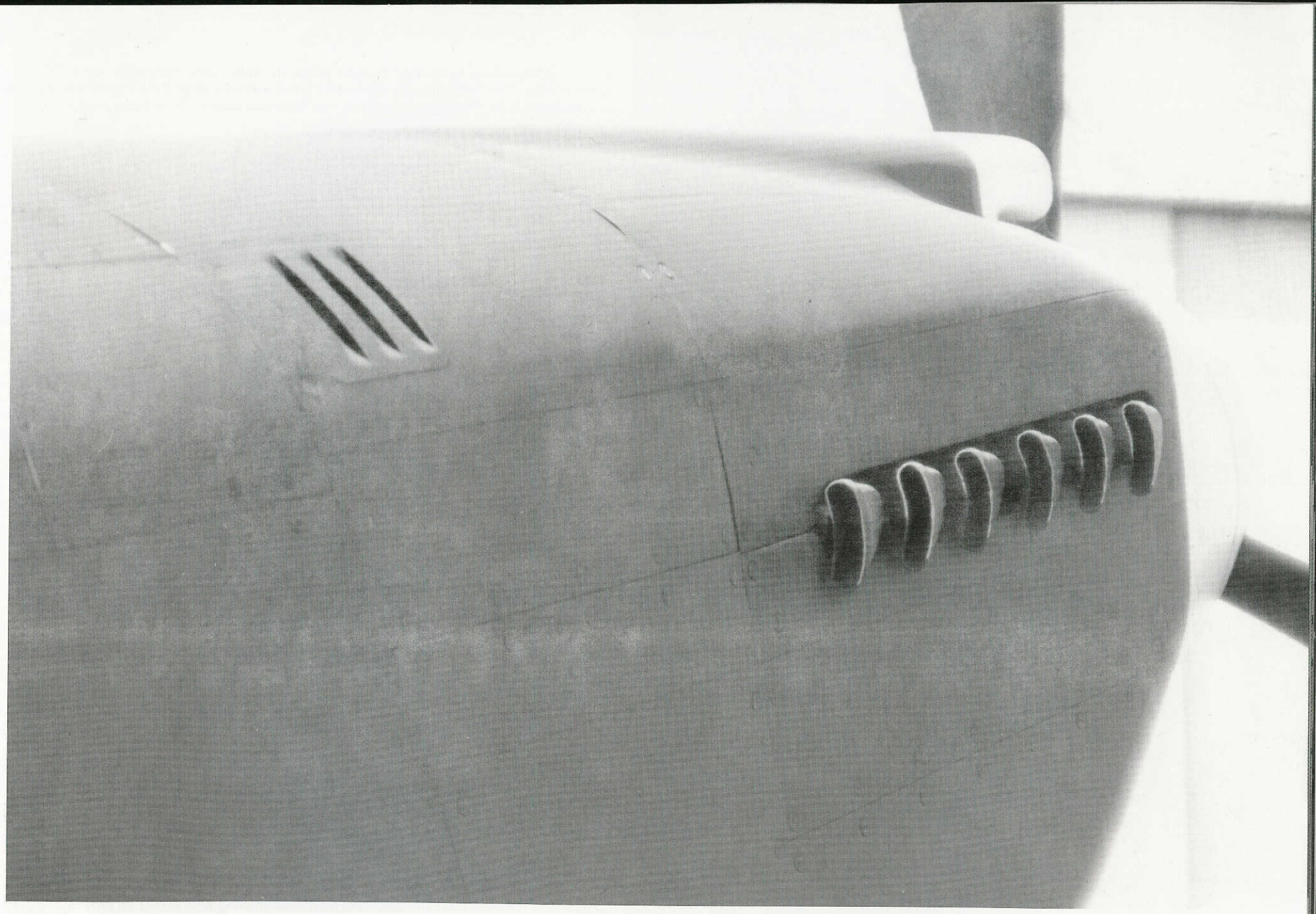


The P-51A's upper engine cowl had a noticeably wider intake shroud and a wider, more angular opening than the Mustang I.

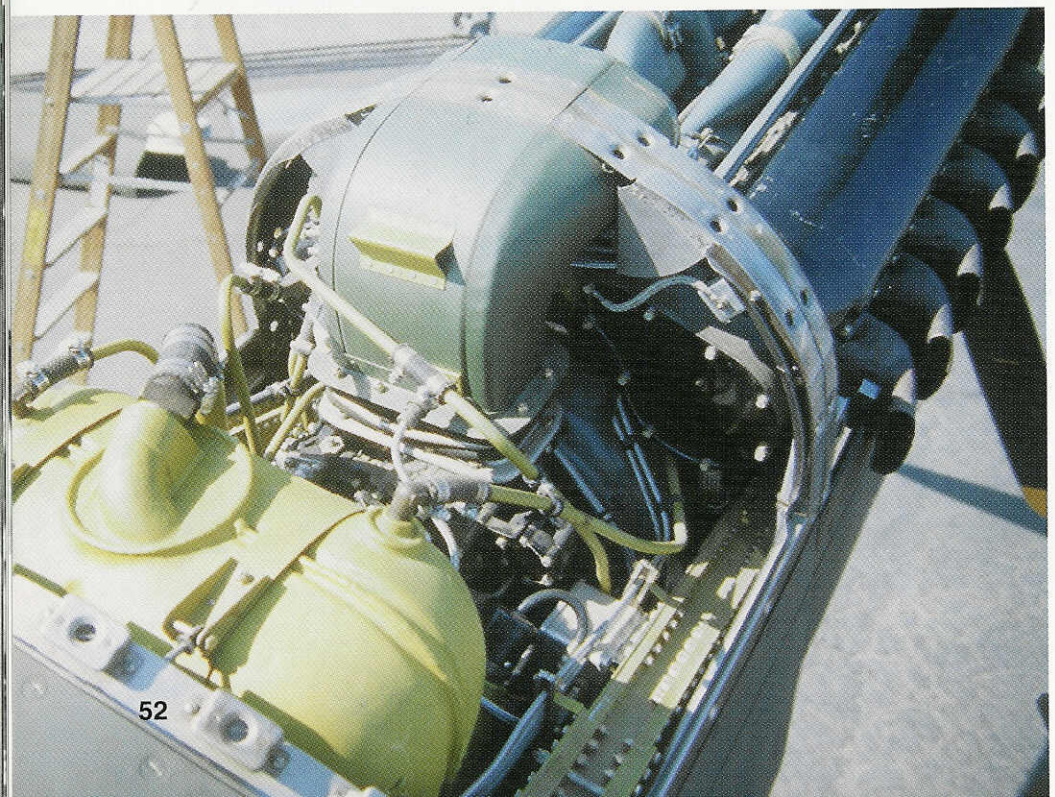
The interior ducting was also much larger, although it did not conform to the exterior shape of the shroud.



Not all panel lines and seams are nice and even. Even the flared exhaust stacks have highly visible seams. The flared exhausts replaced the earlier flow-through type of exhausts on the Mustang I and some P-51s. The small door behind the rear exhaust stack opened to allow warm air to be ducted to the carburetor in the event of icing. This system replaced the induction door incorporated in the carburetor intake duct.



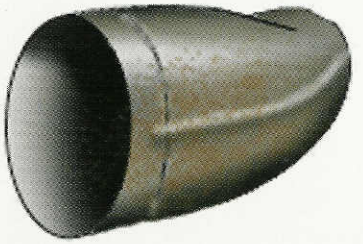
Three small louvers were cut into the upper right side of the accessory compartment cowl to vent the interior.



Each engine cylinder exhausted through two ports which were merged by the stack into a single exit. The flared exhaust provided a small measure of jet thrust and flame dampening. Some RAF Mustangs were fitted with fishtailed stacks which had a prominent flare at the end.

Exhausts

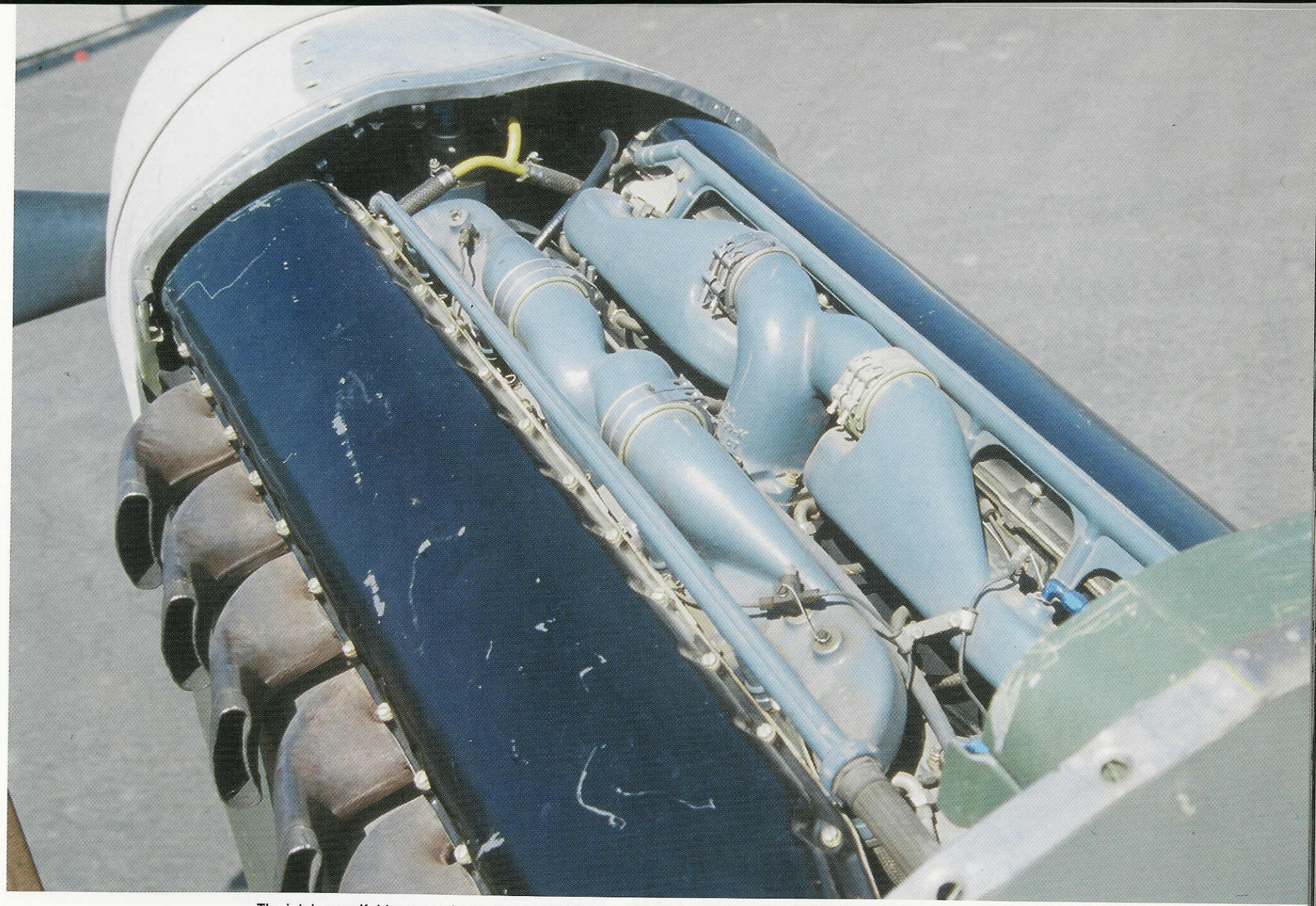
Flared (A-36/P-51A, Retrofitted to Mustang I and P-51)



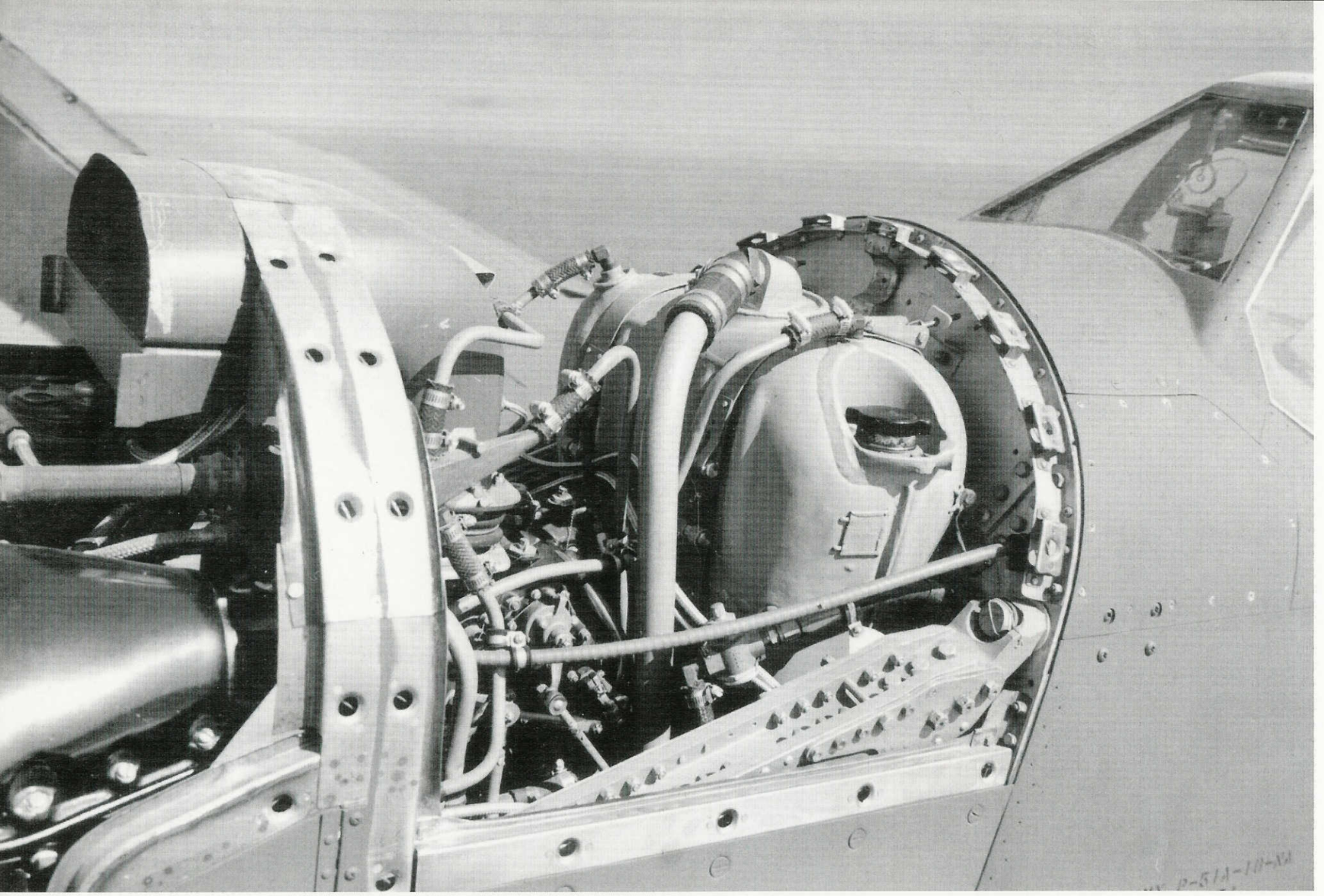
Tubular (Mustang I/P-51)

Fishtail (Some RAF Mustangs)

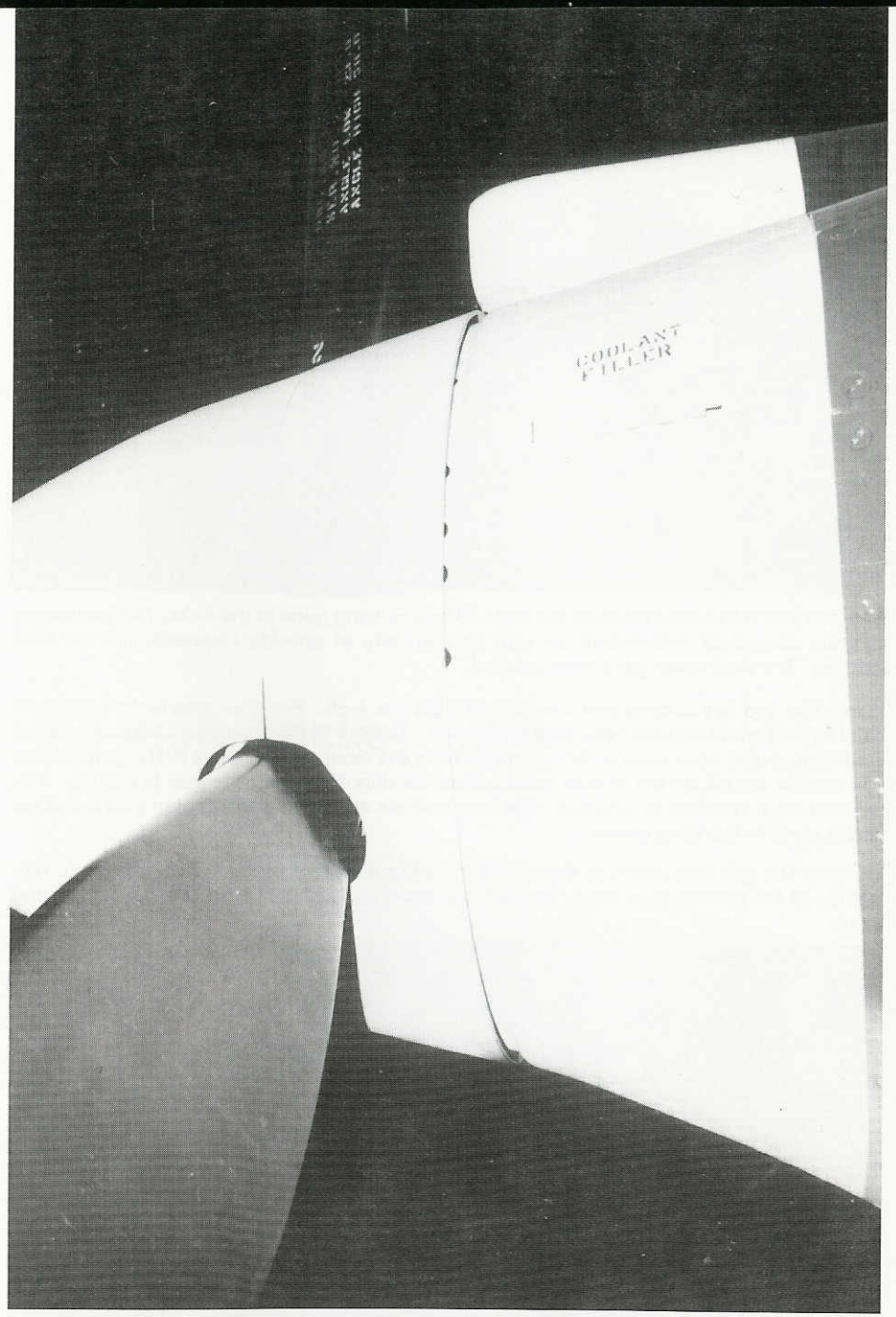
The elbow between the carburetor and the intake ducting also served to provide support for the cowl panel mounting strips. The main structural rigidity was provided by the bolted and riveted engine mounts and then interlocking all the formers and cowl panels together into a single unit.



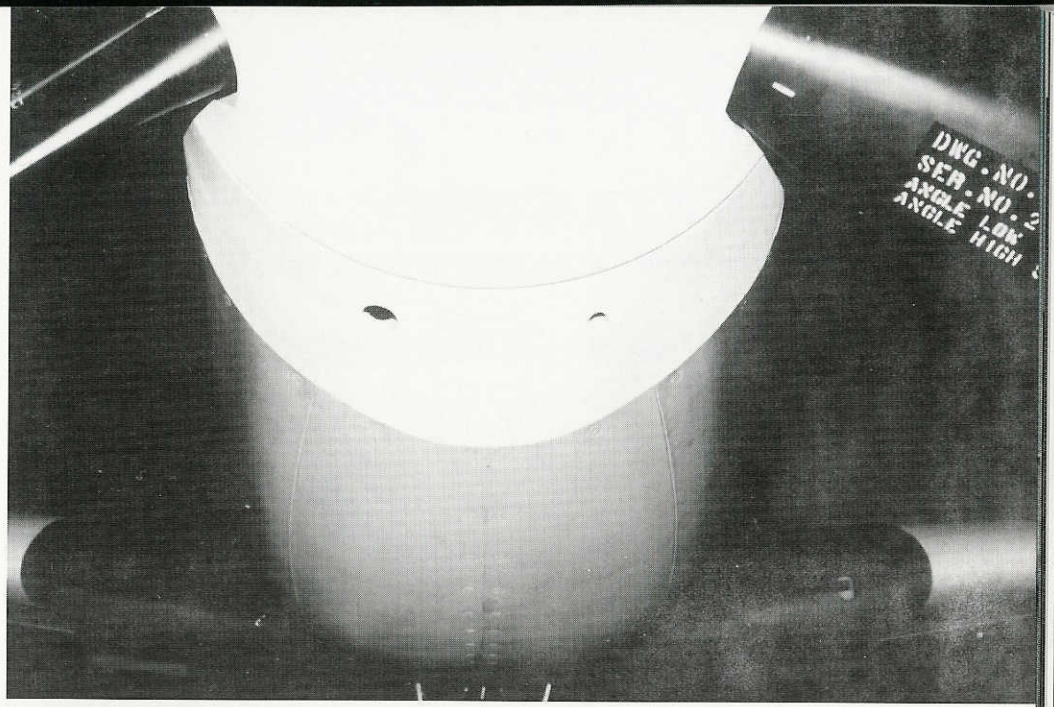
The intake manifold was a twisting, turning affair, sometimes referred to as "ram's horn" manifold. The fuel-air mixture, after leaving the supercharger at the rear of the engine, went forward and up into the six piece manifold, where it was delivered to the engine cylinders.



The oil tank was strapped to the firewall and flanked by the engine mounts. Reinforcing plates were bolted to the engine mounts at critical joints. The other half of the unsung Dzus fastener consisted of a spring wire visible through the holes in the cowl formers.

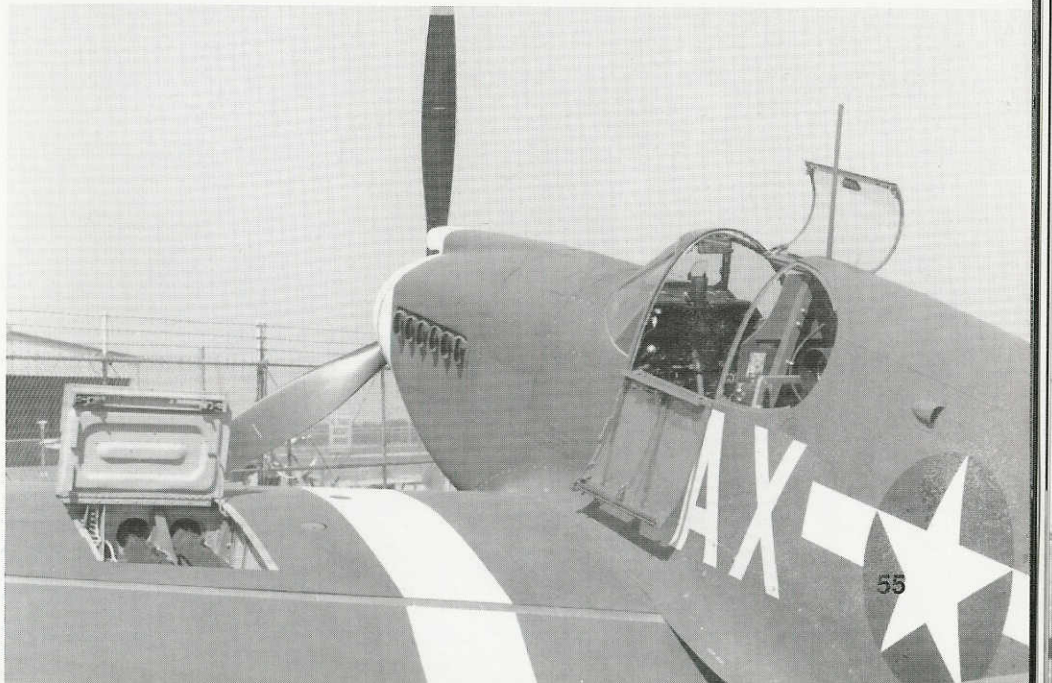


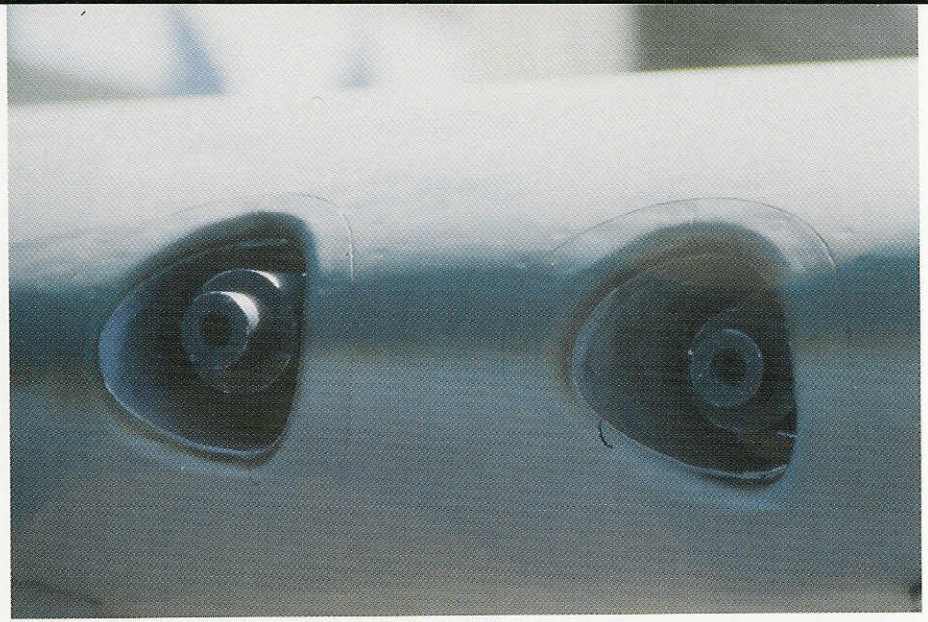
The front surface of the nose ring was beveled so the spinner actually fitted over it. There was no visible gap between the back of the spinner and the front of the nose ring.



Two holes in the nose ring provided de-misting air for the inner and outer surface of the windscreen by ducting air through the warm engine compartment. There were some variations in this arrangement.

Getting in and out of the cockpit was easy. Getting to the cockpit was another matter. The flap and fillet were not supposed to be stepped on. The best way to get on the wing was to go up over the front via the tire.

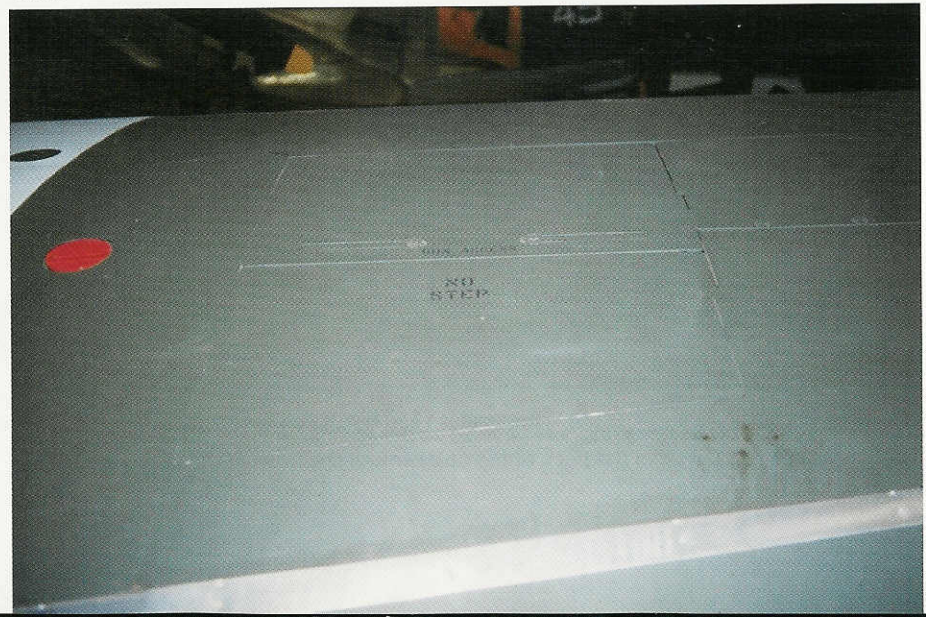




(Above) The P-51A also retained the twin .50 caliber wing guns of the A-36. The guns were slightly staggered fore-and-aft as well as vertically to provide clearance for the feed chutes. The A-36 nose guns were deleted.

(Left) The gun bay access was unchanged from the A-36. The door was locked with two latches and could be held open with a prop rod. The top of the guns were angled outward and feed chutes were used to bring rounds from the ammunition boxes to the guns where the chutes would almost double back before turning down into the gun breeches. The system often resulted in jamming. Spent cartridges and links were ejected overboard via small ports in the wing bottom.

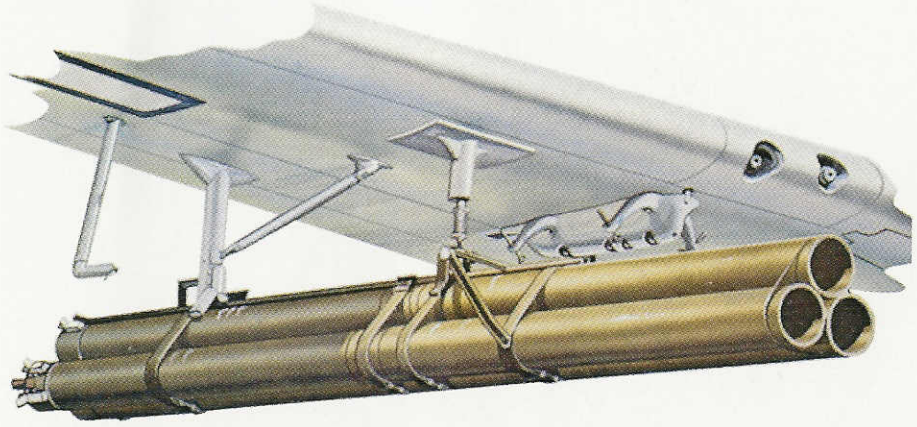
(Below) The gun bay doors fit flush with the wing and maintained the aerodynamic efficiency of the laminar flow wing. The red cap covers the fuel filler for the starboard wing tank.



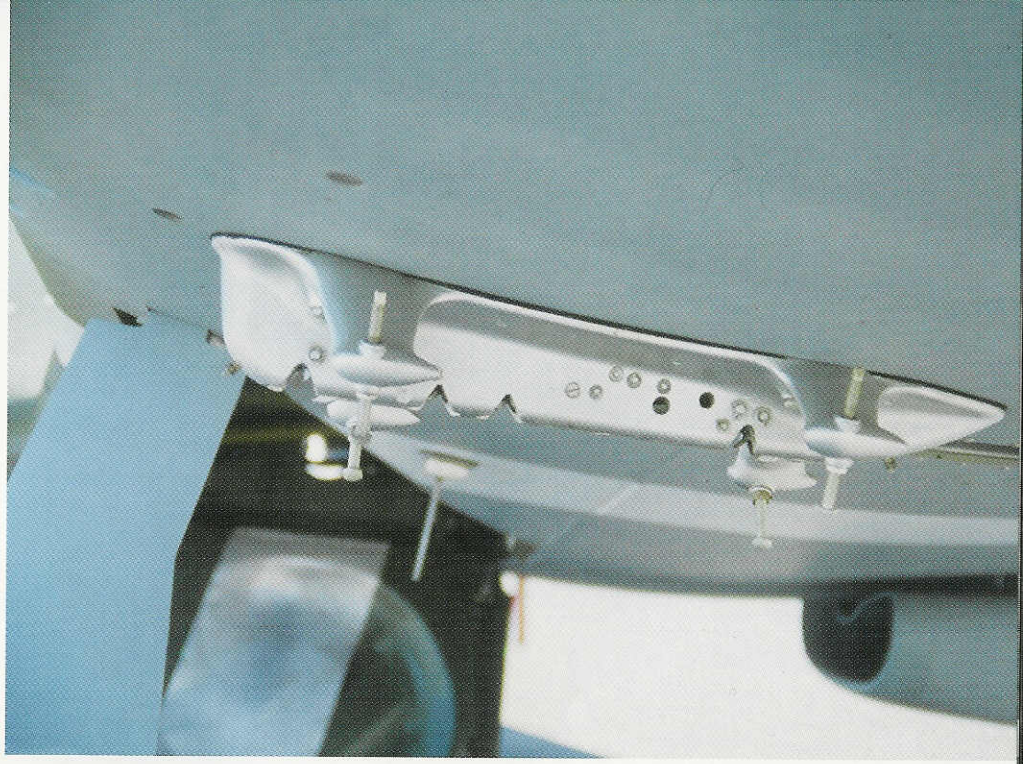
The A-36 and P-51A were given underwing bomb racks They were identical and could be used on either wing. The rack had built in sway braces.

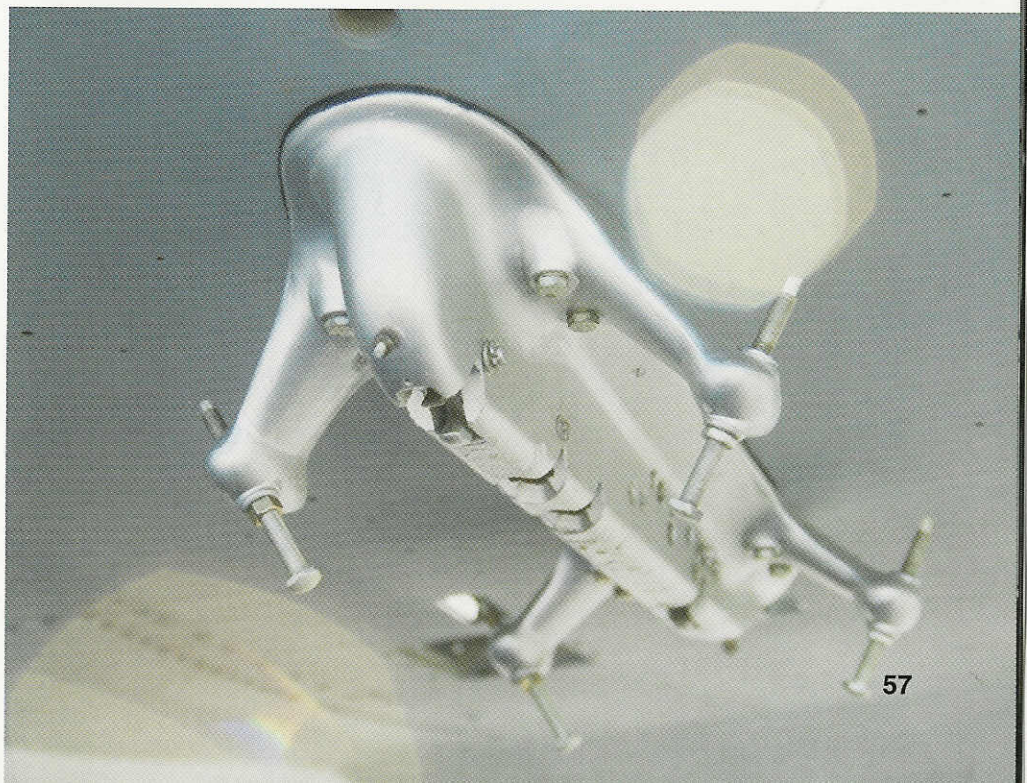
75 Gallon Drop Tank

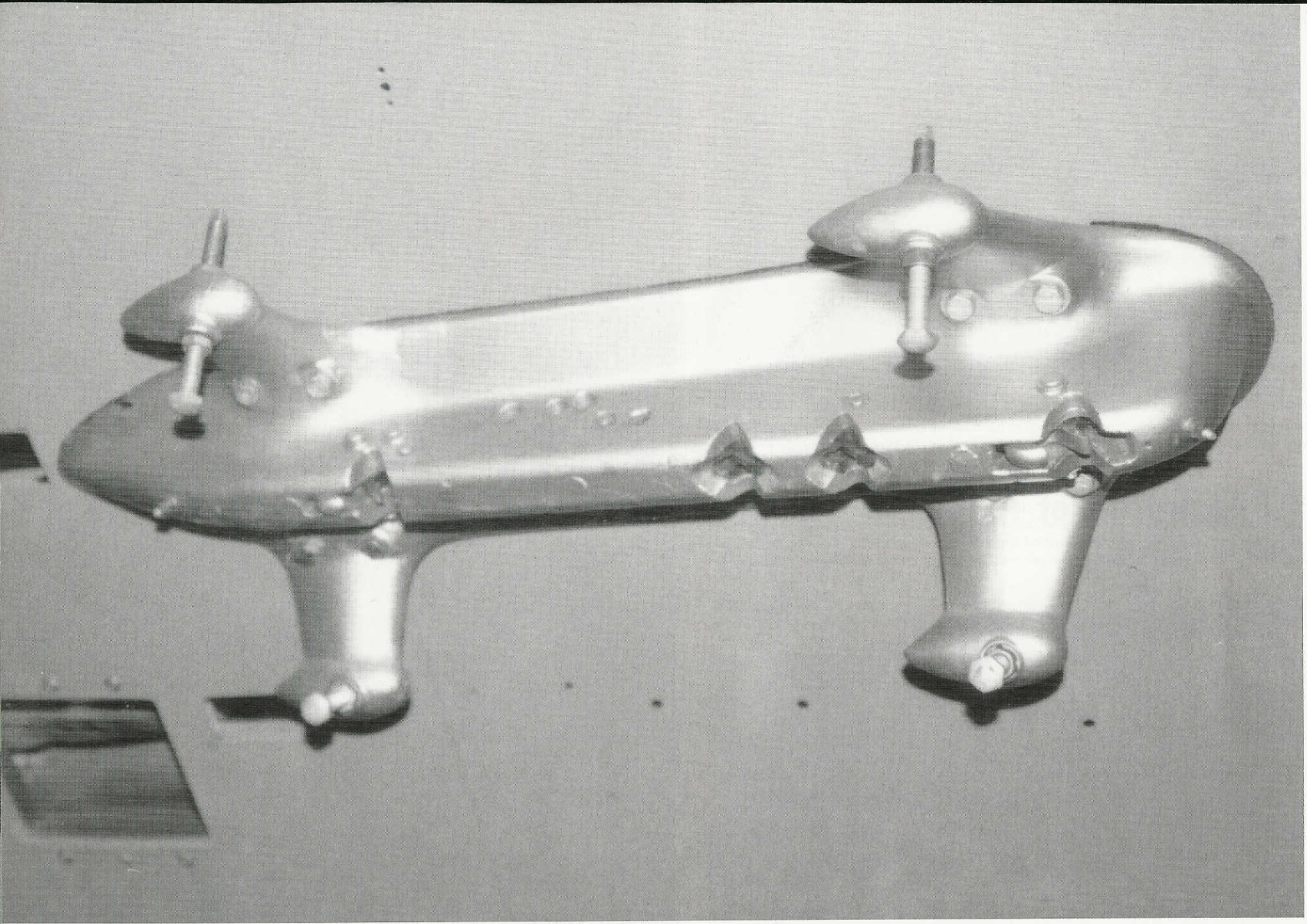
2.5 Inch Rocket Tubes



P-51As were further plumbed to carry a 75 U.S. gallon drop tank under each wing. The fuel pipe connected to a fitting in the wing. A 150 gallon tank could be used for ferry purposes.



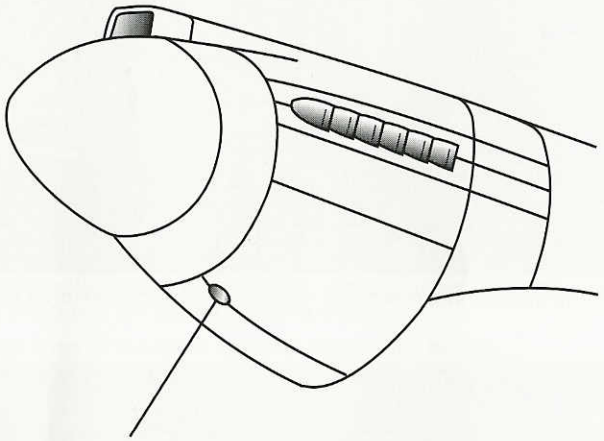




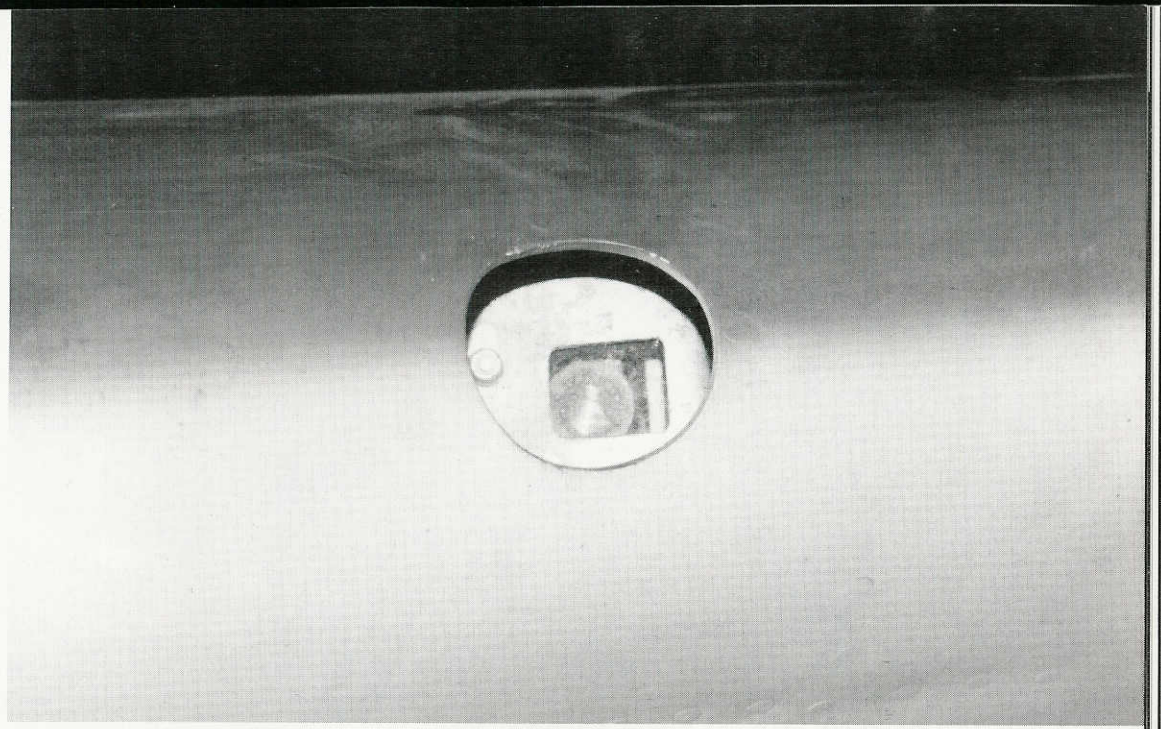
The sway brace arms were built into the rack. Adjustable pins were tightened down onto a bomb or drop tank to prevent movement in flight. This style of rack would also be widely used on P-51Bs and Cs.

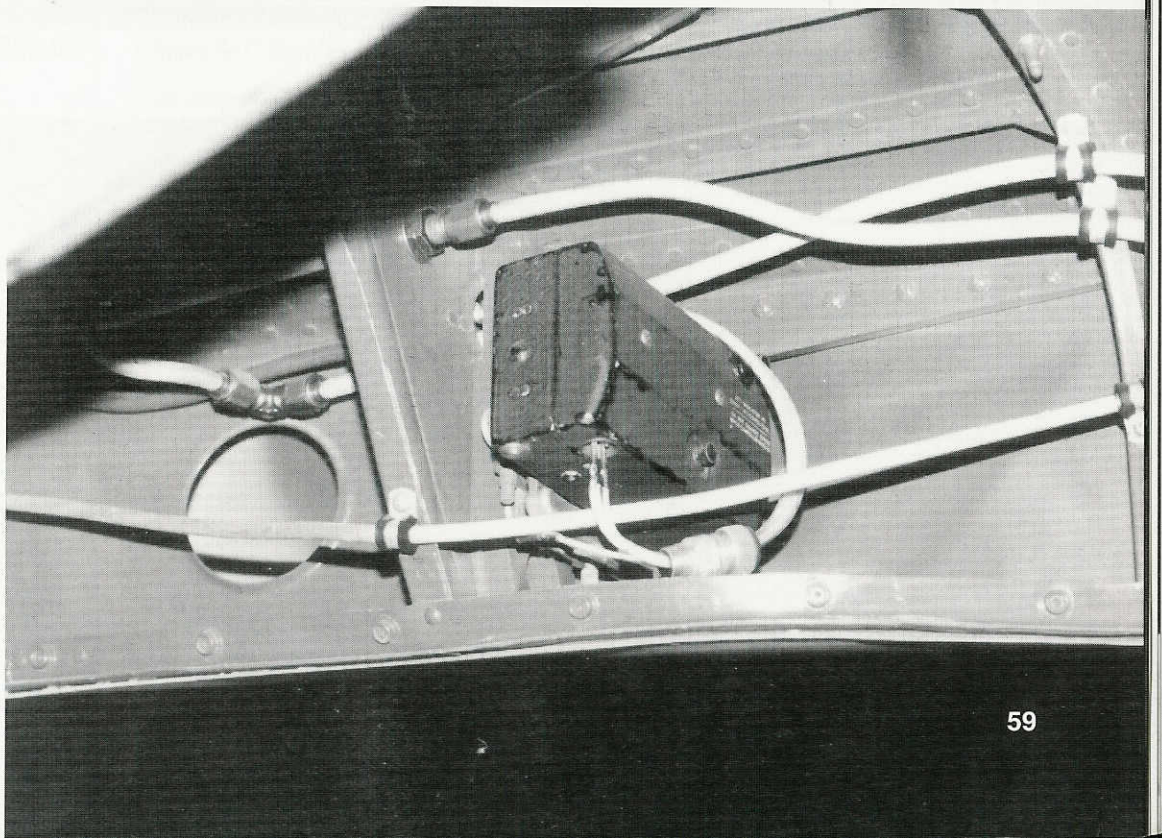
P-51As had the gun camera relocated to the inboard portion of the left wing.

Initial Camera Port Location - P-51/A-36



Camera Port





Access to the relocated gun camera was provided via the left wheel well.

(Above) The left wheel/strut well became the new home for the gun camera. The camera had previously been centered in the bottom of the nose ring.

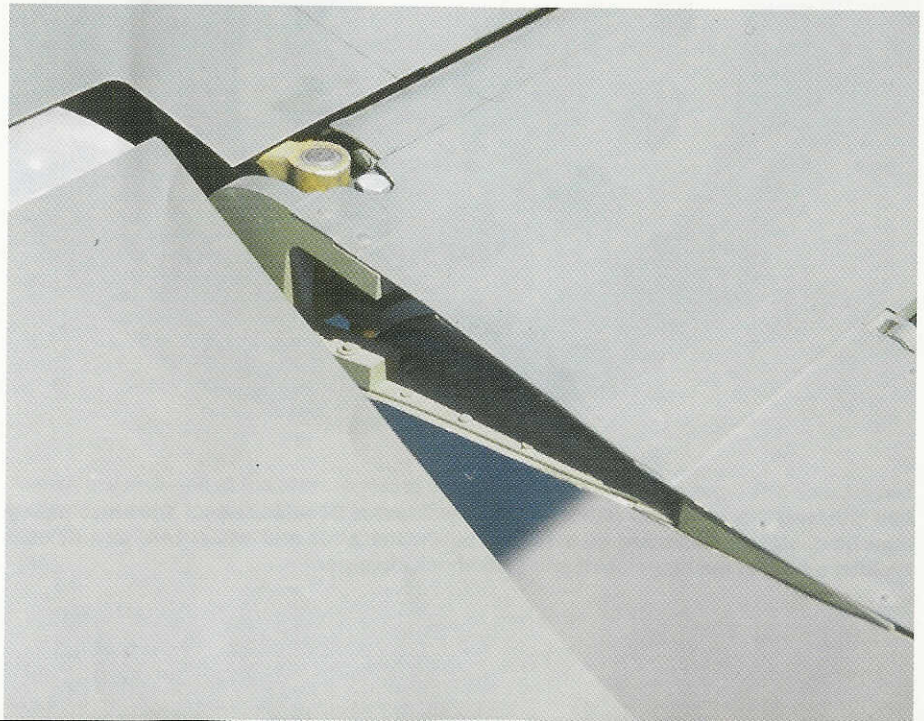
(Below) Mustangs were equipped with a one piece, trailing edge, metal covered flap.

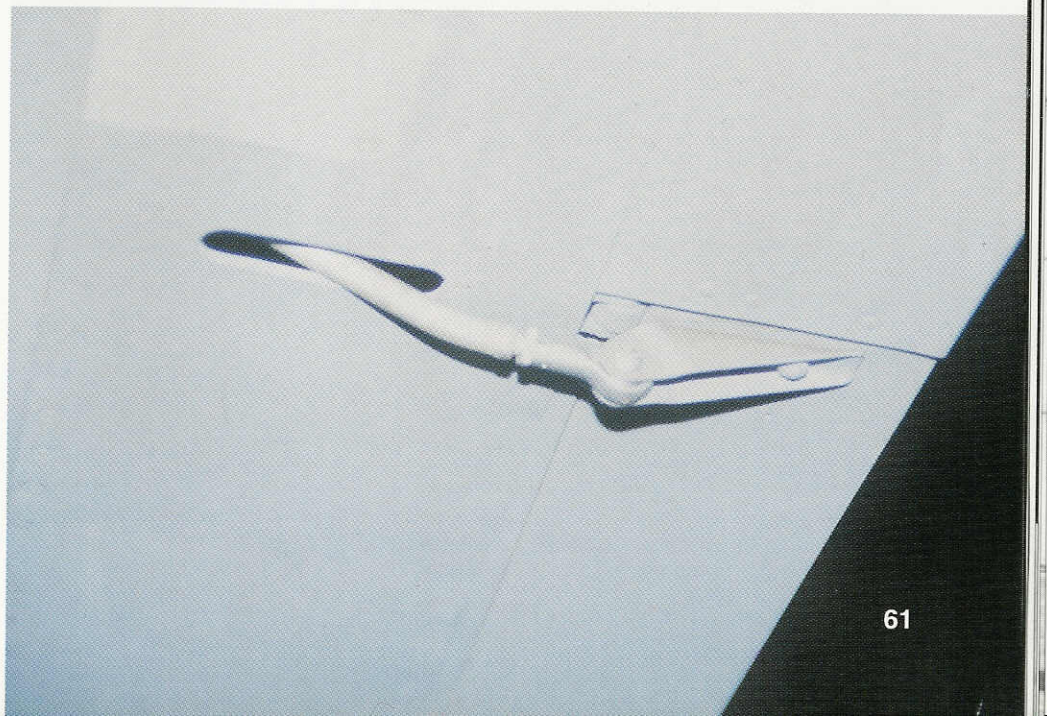
The inner portion of the flap actually came up under the wing root fairing. A small weld bead is visible on the fairing's trailing edge.

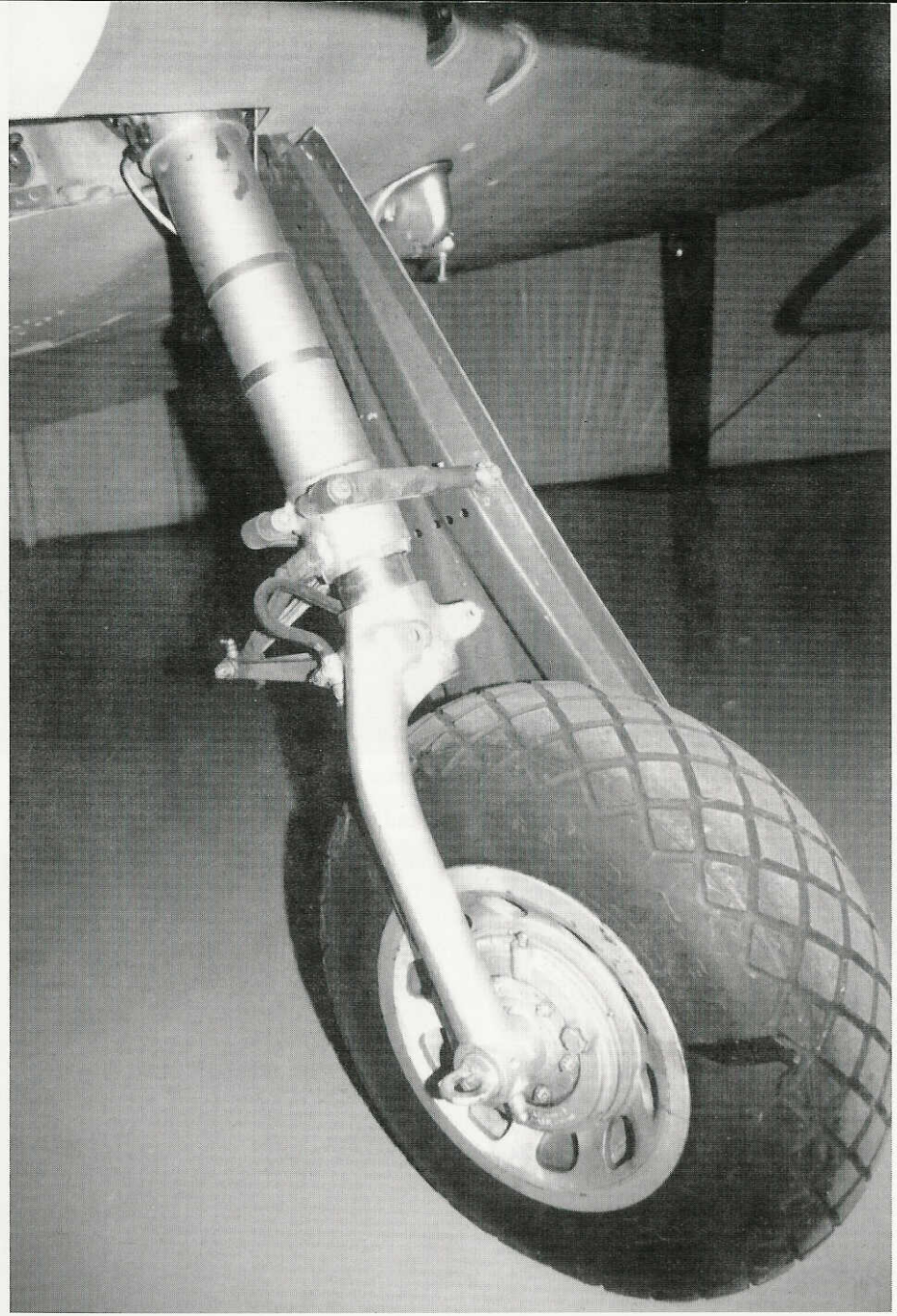
The inner edge of the metal covered aileron was hollow.

The outer edge of the flap was blanked off.

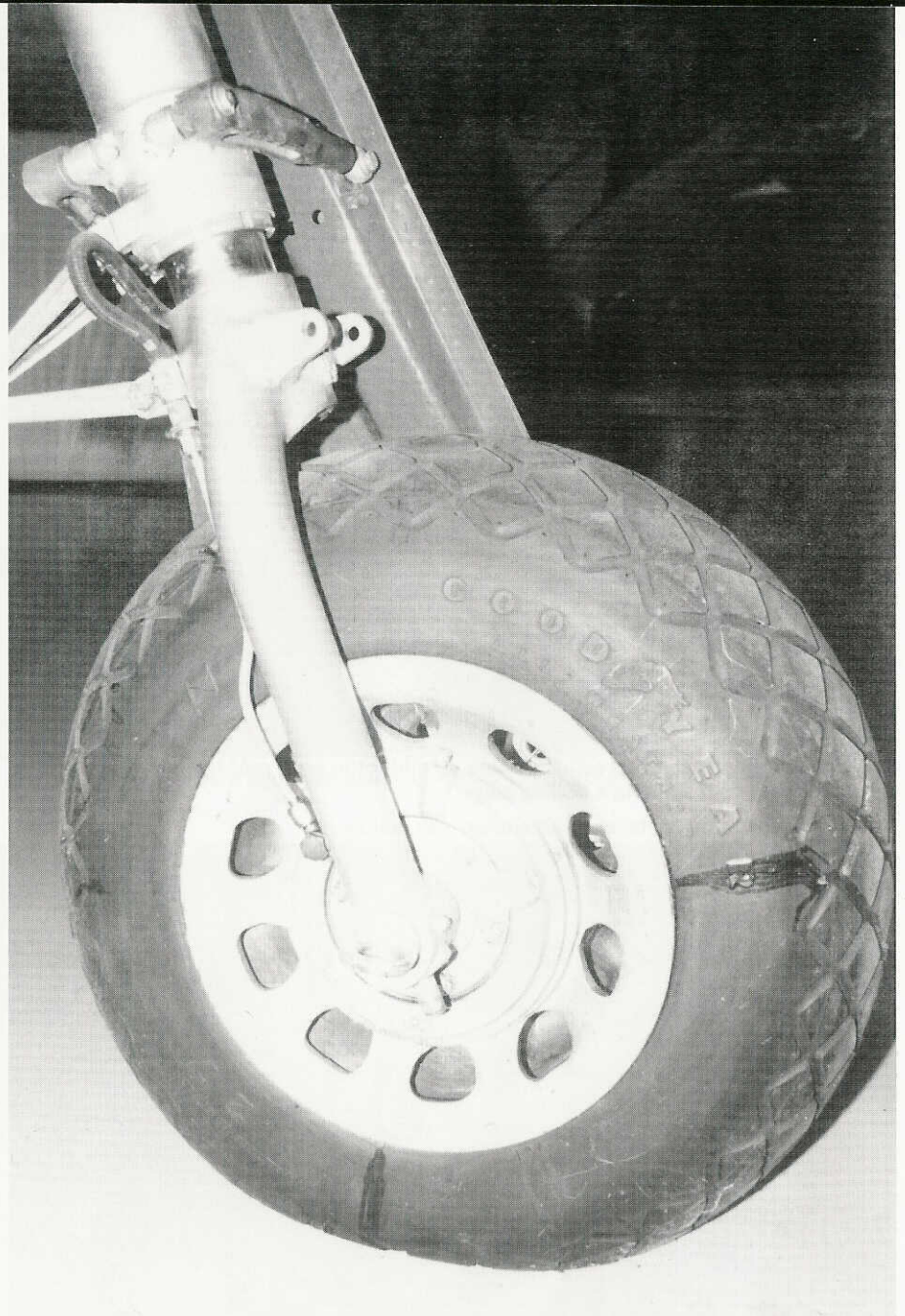
Each aileron was equipped with a trim tab actuated by an external rod and horn.



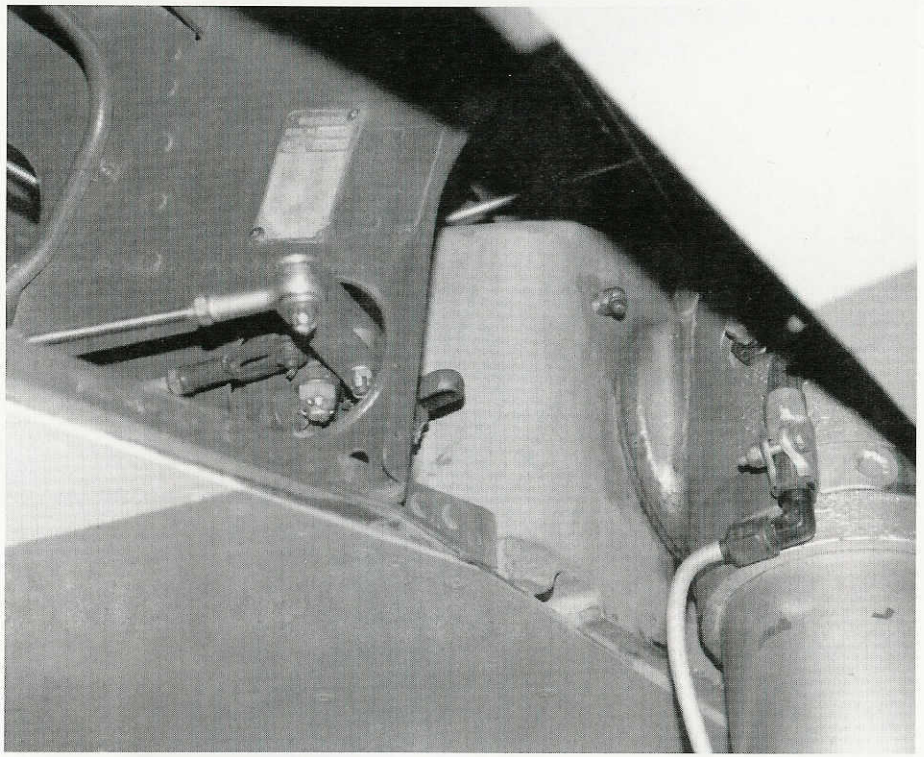




The main landing gear of the early Mustangs changed little. It consisted of a retraction mechanism, a single shock absorbing strut, and a 27 inch wheel. This assembly was bolted to the main wing spar and reinforced wing ribs. The torque link faced aft.



The Mustang was equipped with hydraulically actuated Bendix brakes. The brake piping consisted of a combination of a rigid tube on the strut and wheel fork and flexible braided tubing at the hinge point and oleo shock absorber.

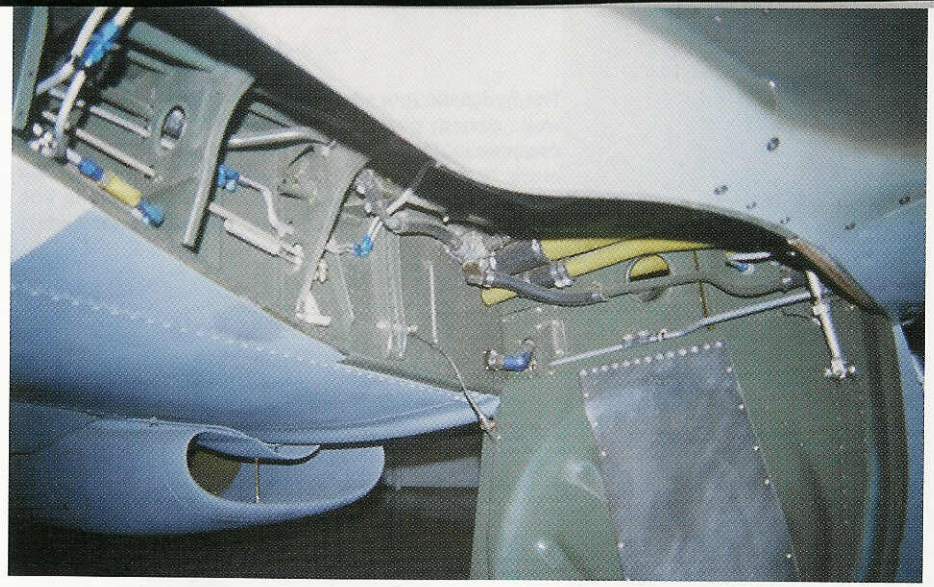


The retraction mechanism was bolted to the main wing spar and ribs. Flexible tubing was used for the brake line in this area.

The wing was joined at the centerline and was, by necessity, very strong. The area served as the focal point for bits of hardware — the hydraulic ram for the wheel well door, the two mounting points for the door, and the coolant pipes running between the engine and radiator.

The struts were normally painted with a silver lacquer. The wheel, the strut well, and the inside of the doors could be Interior Green or silver with Interior Green being the most common. The strut well door was hinged at the top. Two small articulated struts fastened the door to the strut just above the torque link.

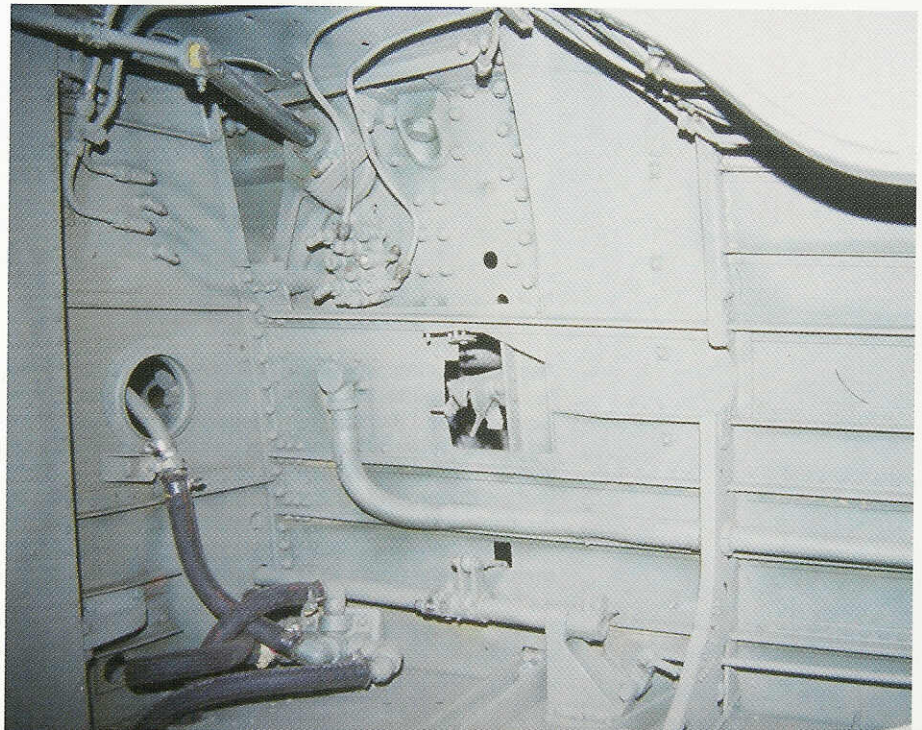
Initially, Mustangs were equipped with smooth tires, however, as the war progressed treaded tires became more common. Both diamond and block tread were used with the diamond tread being slightly more common. Some photos show Mustangs equipped with a diamond tread on one wheel and, for reasons known only to the crew chief and the supply sergeant, a block tread on the other wheel.

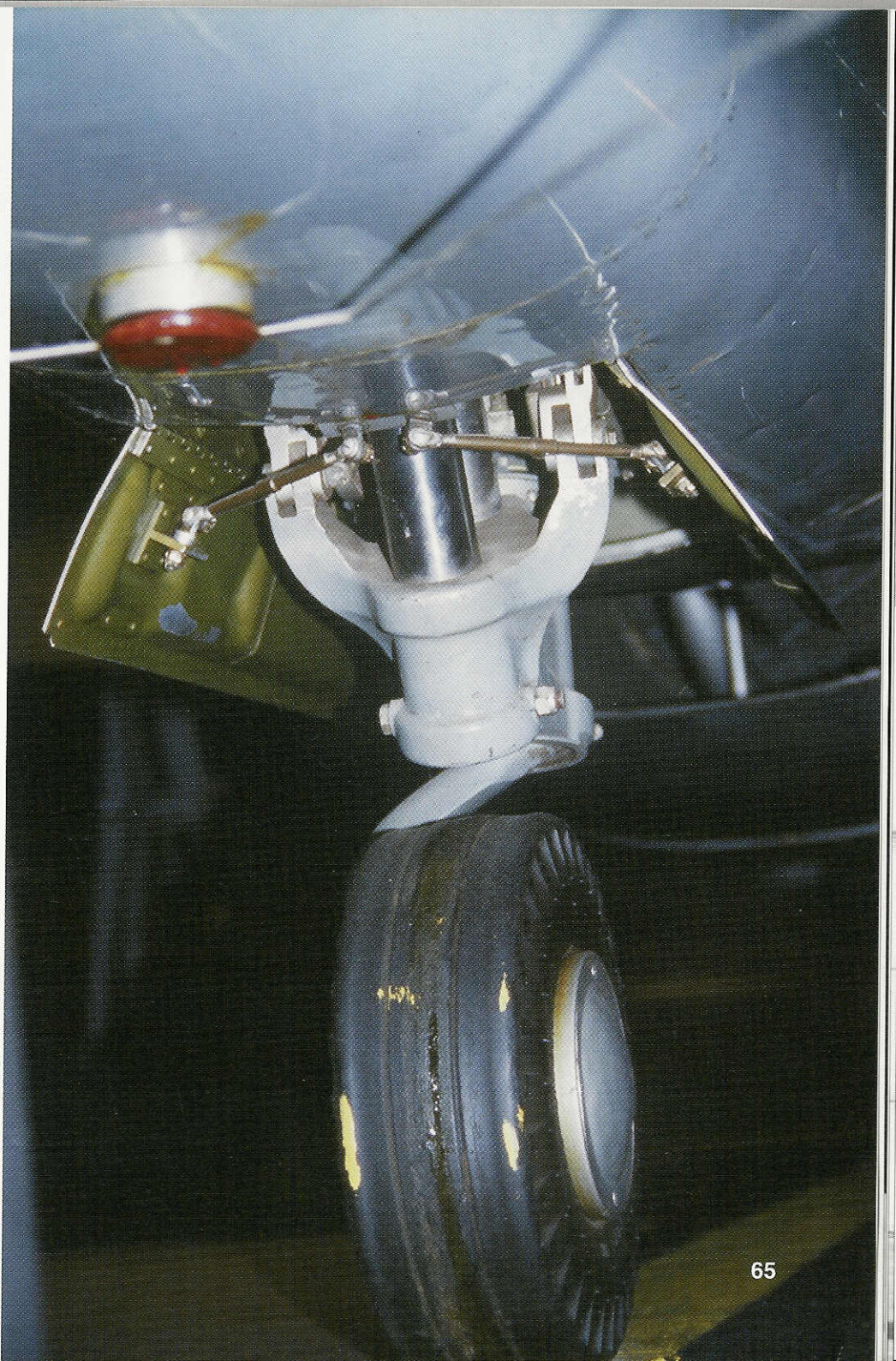


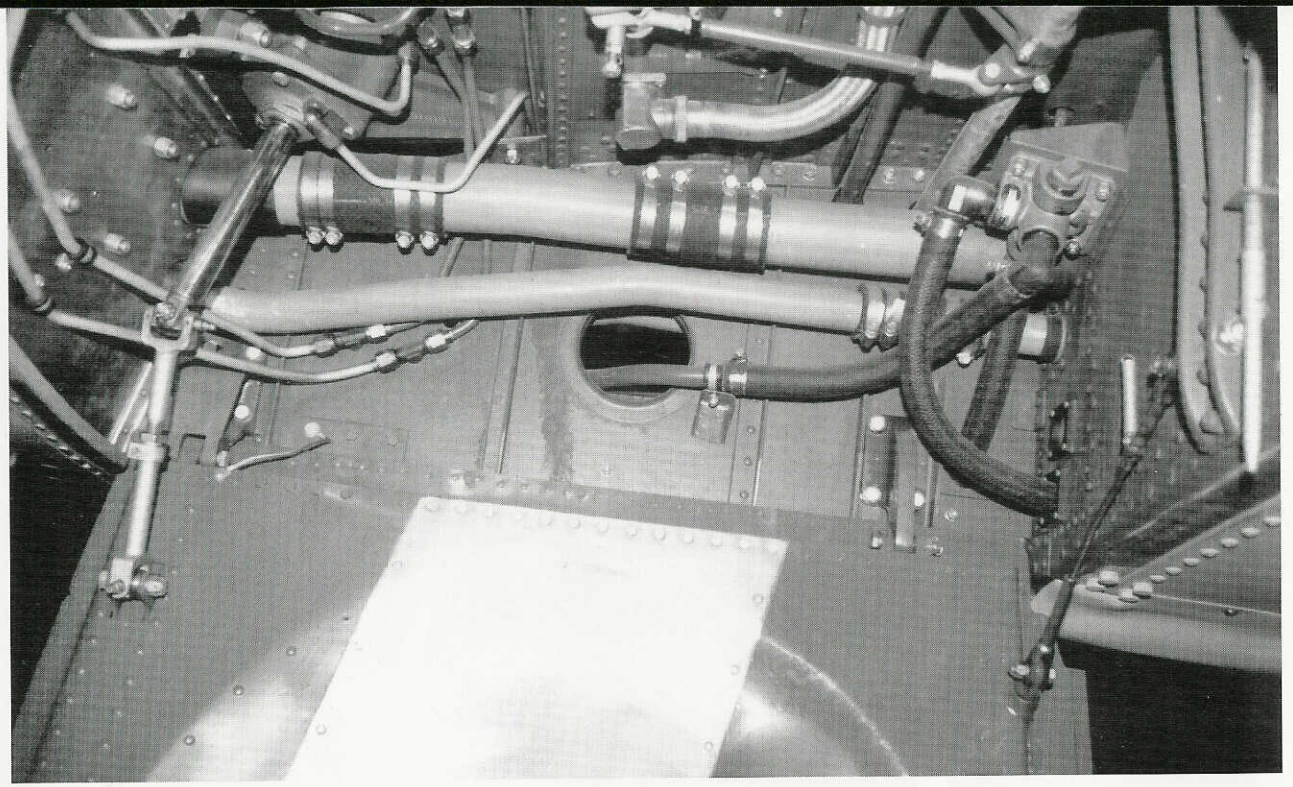
A one-piece door covered the wheel strut well, while a second one-piece door covered the wheel well. While on the ground, the wheel well door could be locked in the up position by means of a small latch at the rear of the wheel well.

(Right) The tail wheel was fully retractable and enclosed by two flush fitting metal doors. The wheel was fully castoring through 360 degrees and steerable within the limits of the rudder pedals.

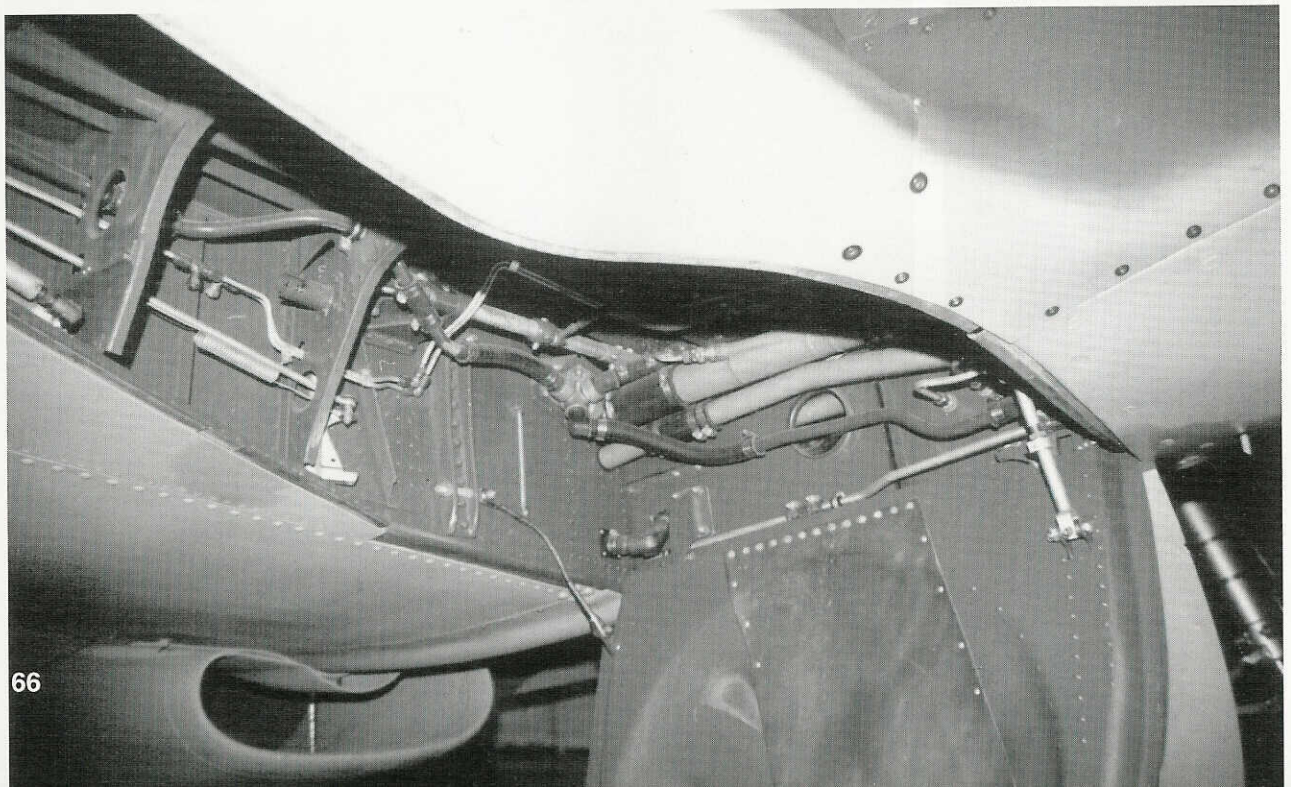
An additional up-lock in the wheel well roof held the gear up. The innermost rib on each wing formed the centerline where the wings were bolted together.





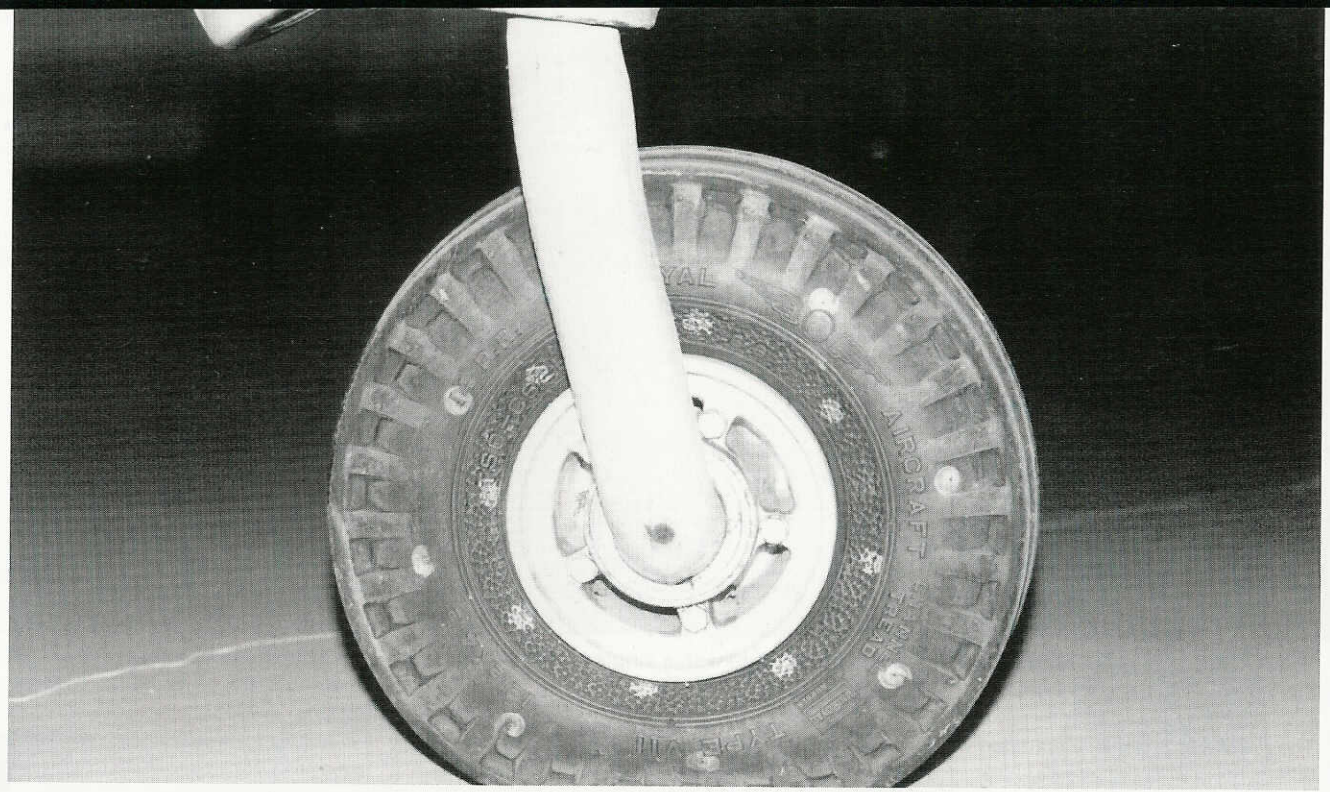


The hydraulic ram served to raise and lower the wheel well doors during the gear retraction/lowering sequence. The large pipes are for coolant, while the black braided tubes are oil lines running to the oil cooler. The silver braided tube is the hydraulic line from the brake master cylinder on the rudder pedals to the brakes.

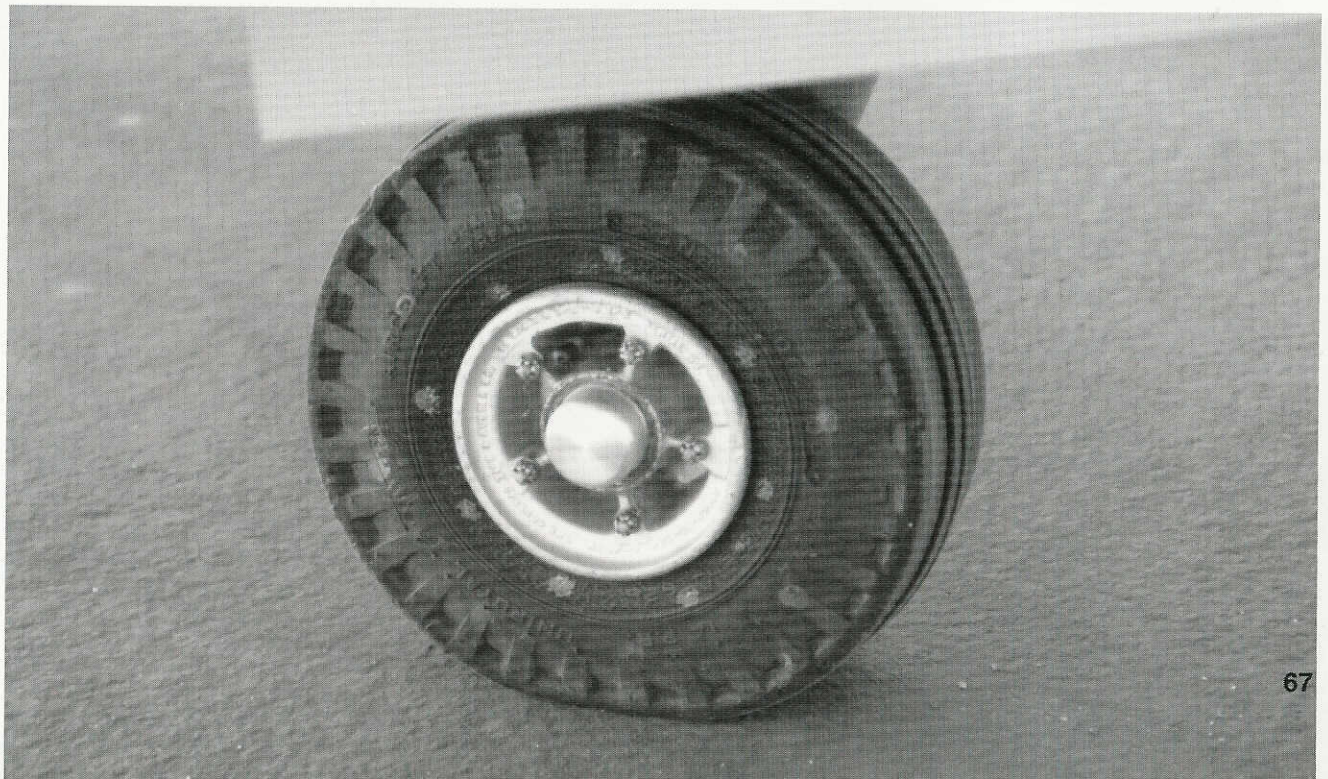


The main wing spar and centerline ribs provided mounting points for various bits of hardware in the wing. Beyond the spar and centerline ribs, there were no 'walls' in the wheel or strut wells. The center gear doors were normally held in the up position in flight and on the ground by the small spring loaded latch at the back of the well. The doors could be unlatched for maintenance. The lack of hydraulic pressure would then allow the doors to droop downward.

The tail wheel was equipped with a 12.5" wheel and tire. Most of the wheels had an open, five spoke design, however there were a few early ones with a wheel cover installed.



The complicated parts of the tail wheel assembly were inside the well. What did show was a very simple strut, wheel, and tire.

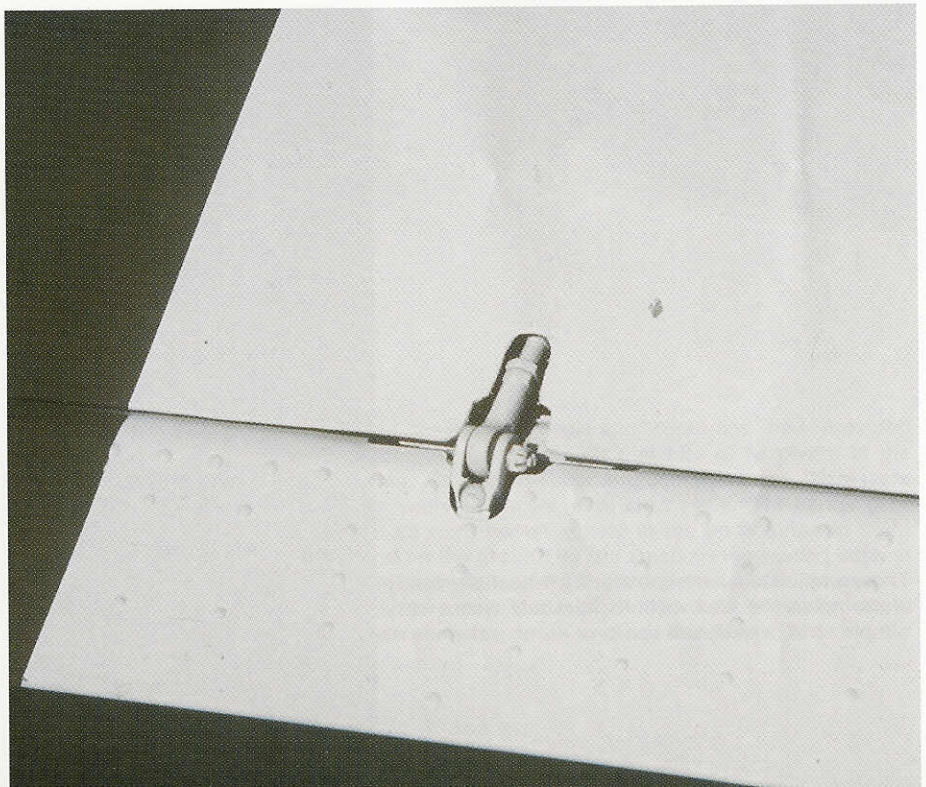


The P-51A saw another rearrangement of the landing light with a single light buried in the leading edge of the port wing.

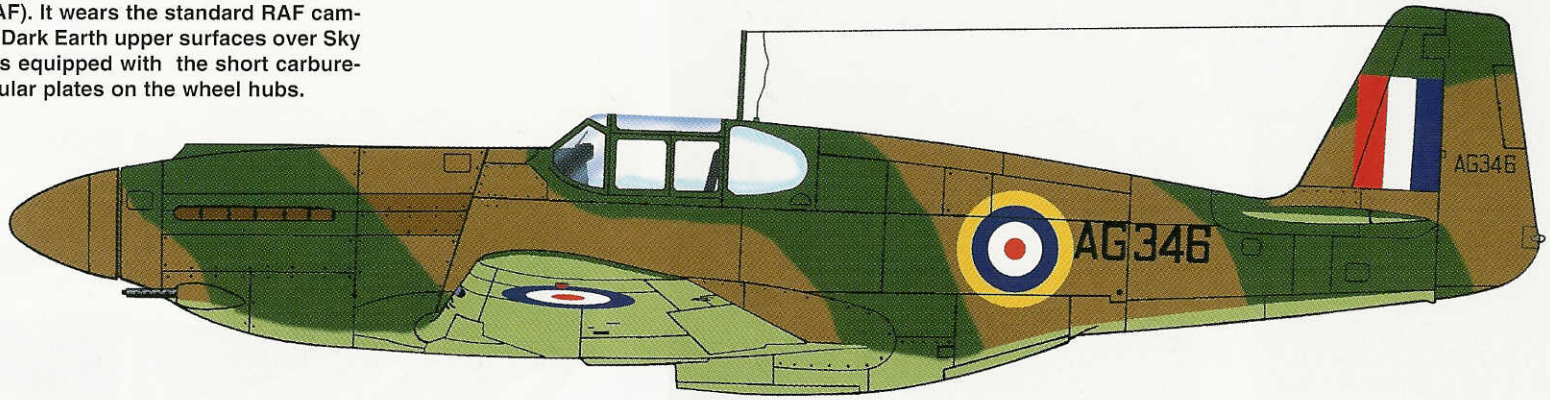
The rudder trim tab was actuated by a single, shrouded rod and horn on the bottom right side of the tab.

The shape and construction of the empennage remained constant throughout the early Mustang's life. The fabric covered elevators and rudder were each provided with trim tabs.

Each elevator had its own tab. The actuating rod was almost flush, but still visible on the top of the right elevator and bottom of the left elevator.

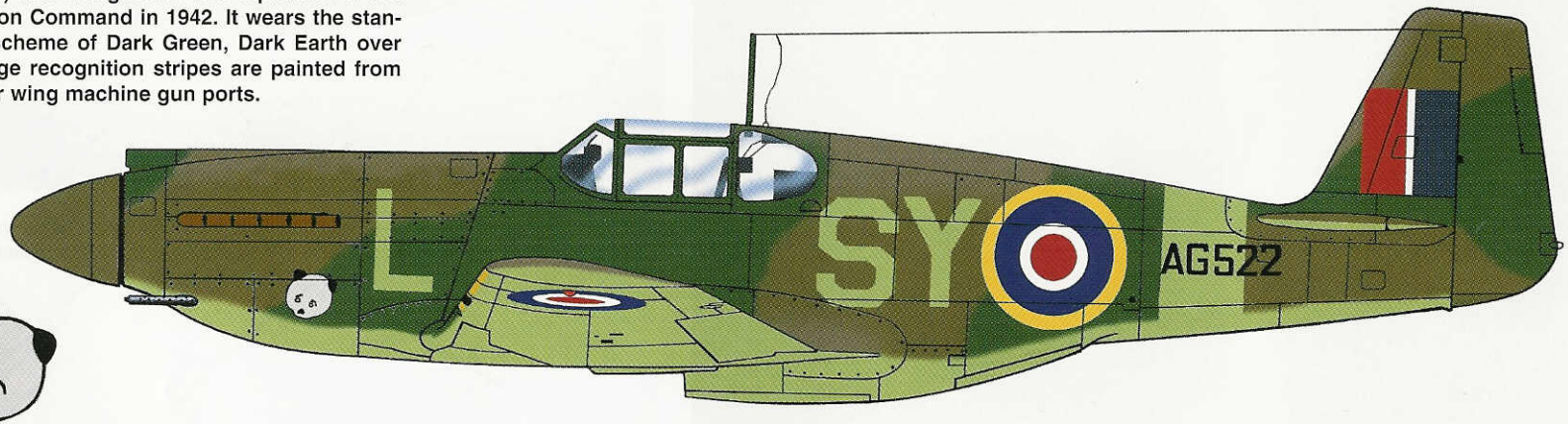


Mustang I (AG346) was the second production machine for the British Royal Air Force (RAF). It wears the standard RAF camouflage of Dark Green and Dark Earth upper surfaces over Sky under surfaces. AG346 was equipped with the short carburetor intake and small triangular plates on the wheel hubs.

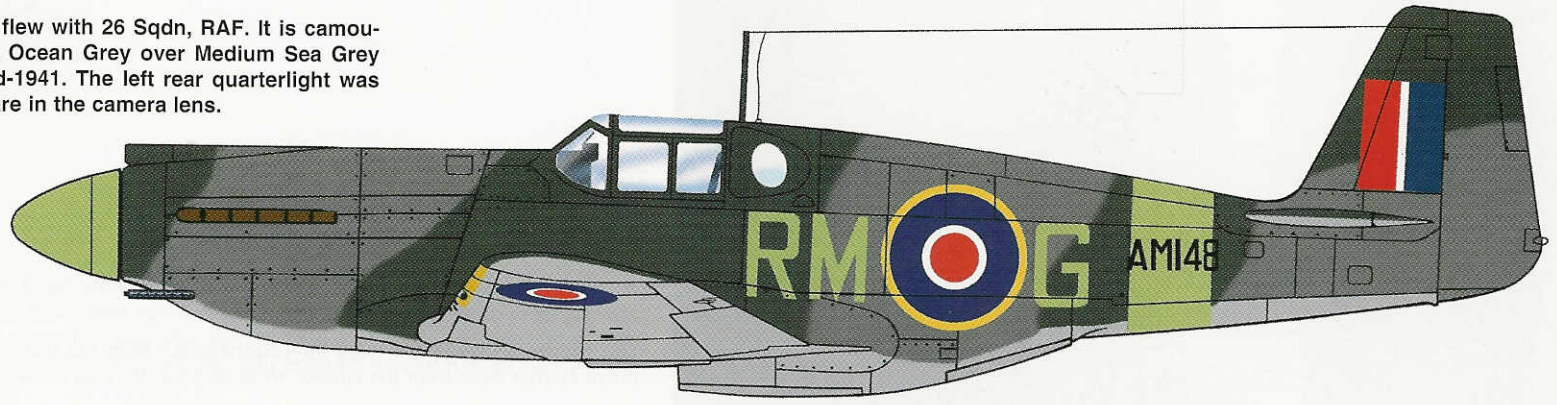


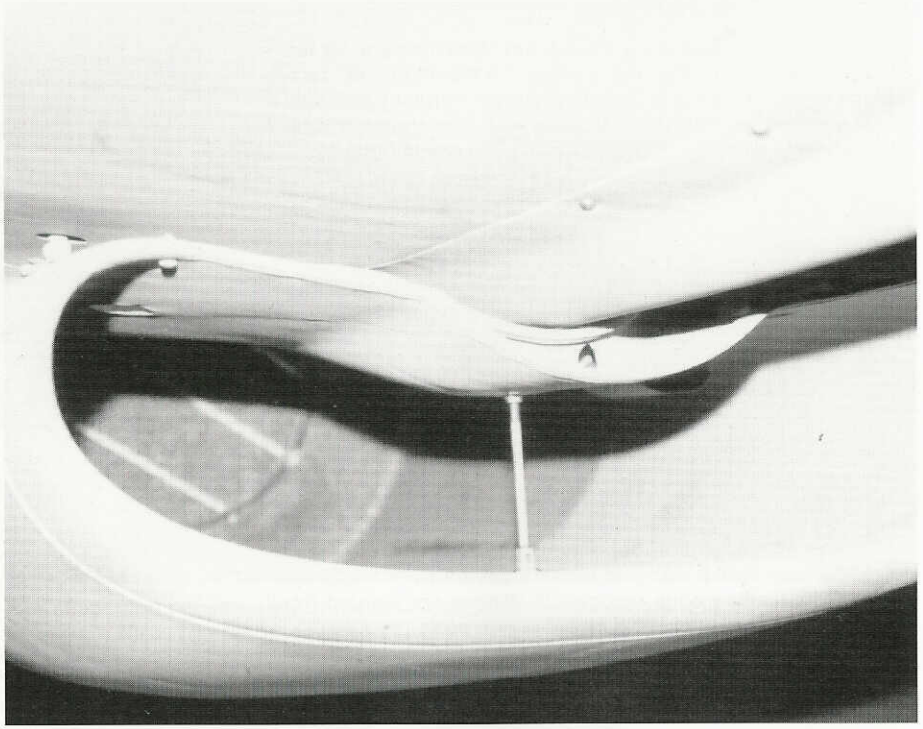
Mustang I (SY~L/AG522) was assigned to 613 Squadron of the RAF's Army Co-operation Command in 1942. It wears the standard RAF day fighter scheme of Dark Green, Dark Earth over Sky. Yellow leading edge recognition stripes are painted from the wing tip to the outer wing machine gun ports.

Panda Insignia



Mustang I (RM~G/AM148) flew with 26 Sqdn, RAF. It is camouflaged in the Dark Green, Ocean Grey over Medium Sea Grey scheme introduced in mid-1941. The left rear quarterlight was painted over to reduce glare in the camera lens.

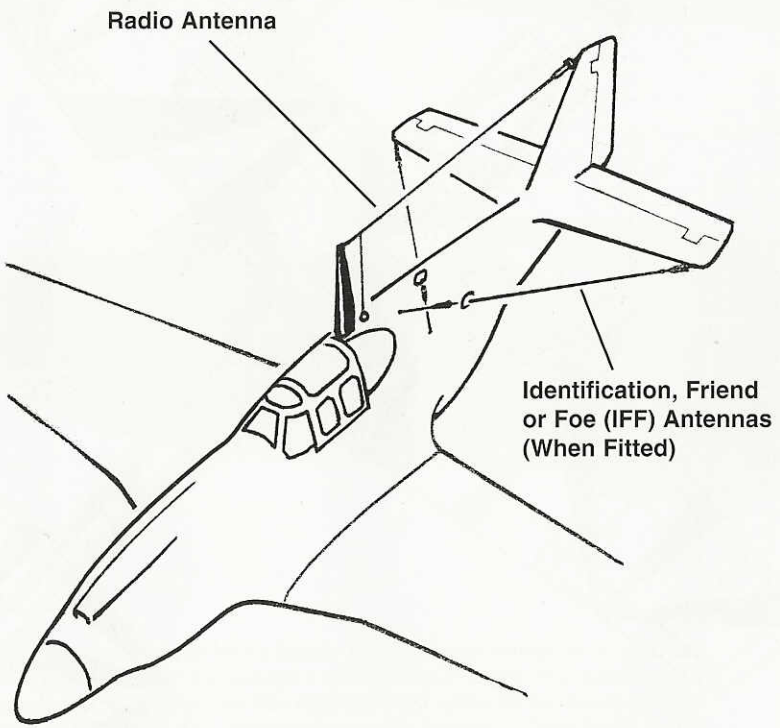




(Above) Both A-36s and P-51As dispensed with the moveable radiator inlet scoop and went to a simpler, fixed scoop. The circular oil and coolant radiators were retained.

The rudder and trim tab were interconnected. With the tab set at neutral the tab would move farther over than the rudder when the rudder was moved.

Antenna Rigging

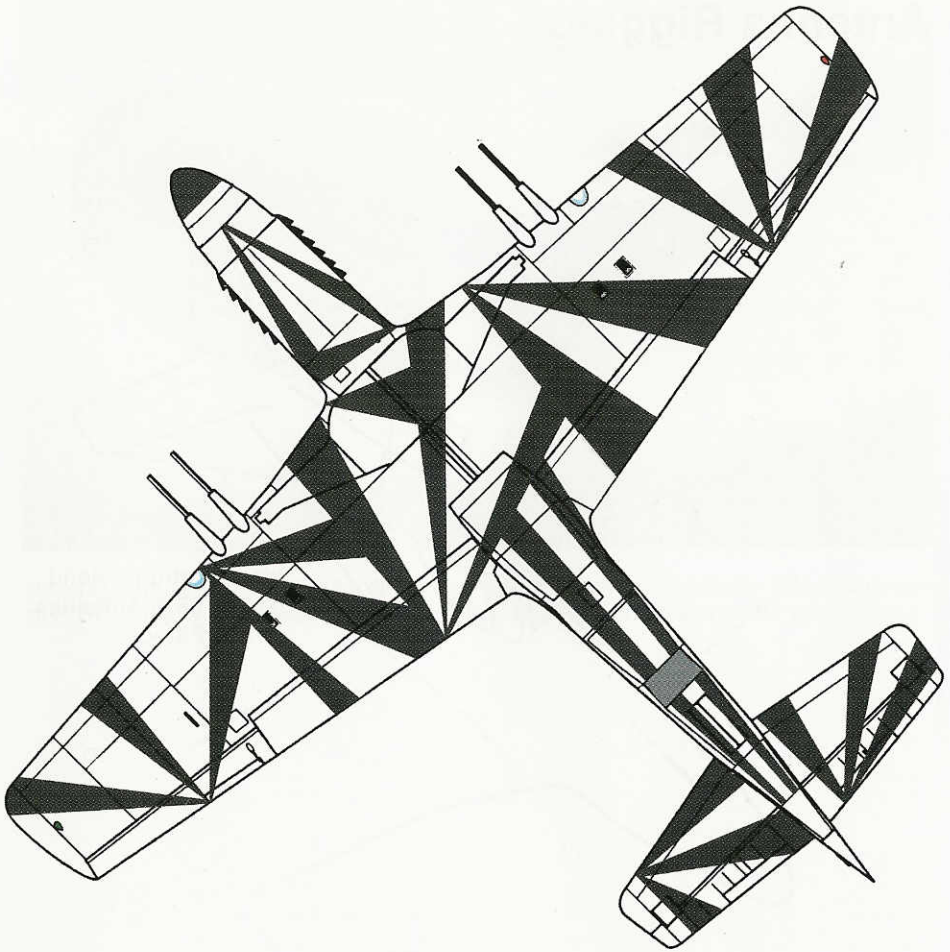


Most early Mustangs were fitted with an antenna that looked like a flattened tube. A wooden blade type was also used, and some A-36s in the MTO used a whip antenna with a wide base. The flattened tube style was also widely used on P-51Bs. Aircraft fitted with the Malcolm Hood were equipped with a flexible whip antenna moved further back on the fuselage spine.

RAF Mustang I Upper Surface Camouflage Pattern (Typical)

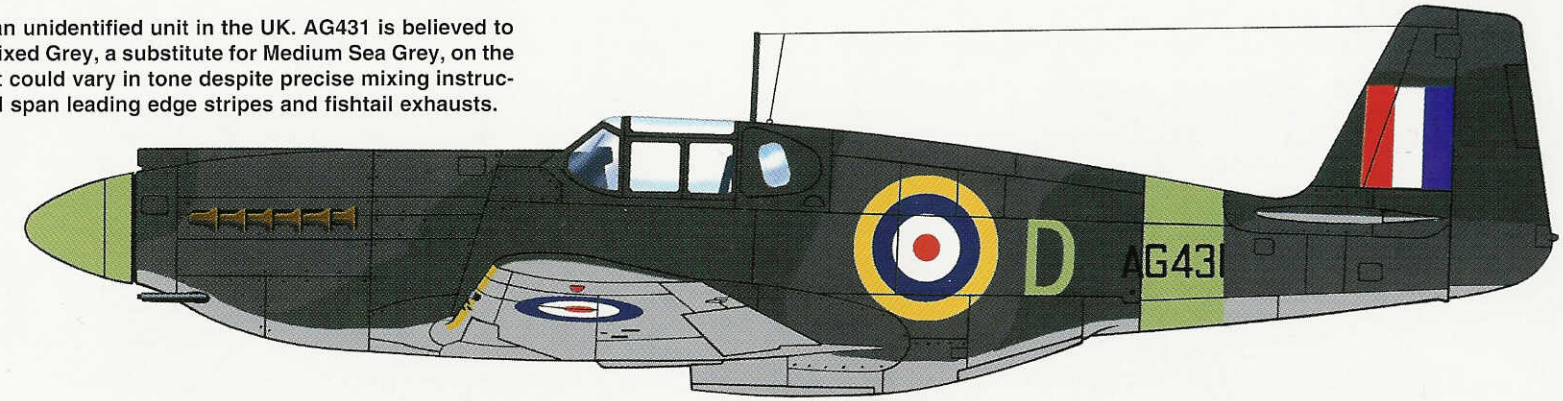
The RAF used a camouflage scheme of Dark Green and Dark Earth upper surfaces over Sky undersurfaces. In mid-1941 a new scheme of Dark Green and Ocean Grey upper surfaces over Medium Sea Grey undersurfaces evolved. In the case of both schemes, the colors and patterns could be reversed. Additionally, wings painted in one pattern could be mated to a fuselage painted in another pattern with the odd joins painted over by field maintenance personnel.

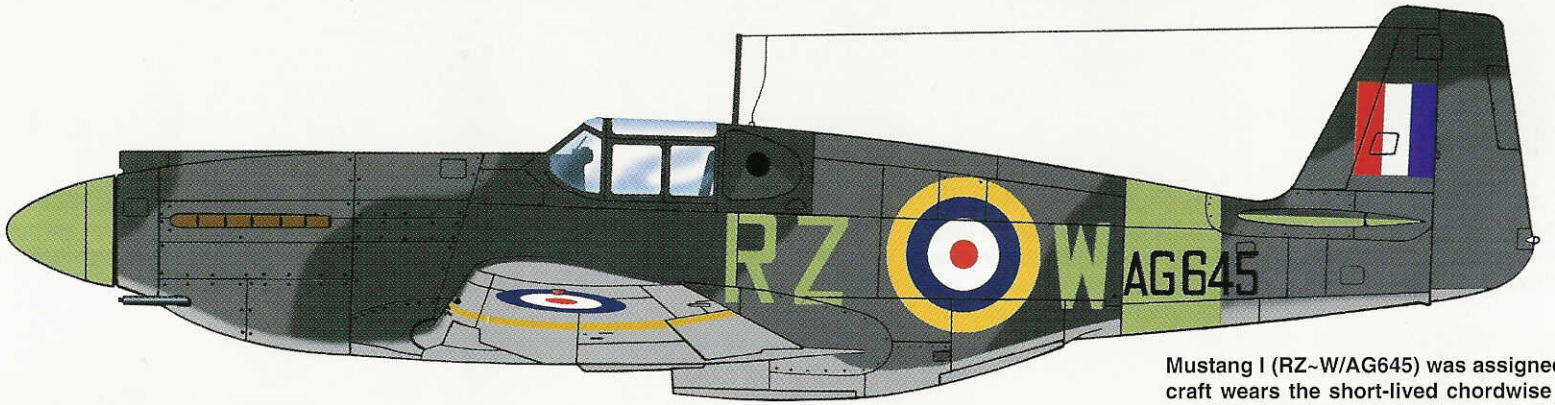
P-51 Under Surface Experimental Dazzle Pattern



USAAF Captain Paul Hexter designed a black and white dazzle camouflage scheme for the P-51 Mustang in1942 that was reminiscent of a WW I warship. While moderately successful, the application and maintenance of the scheme was labor intensive and it was not adopted. The upper surfaces were painted in the standard Olive Drab.

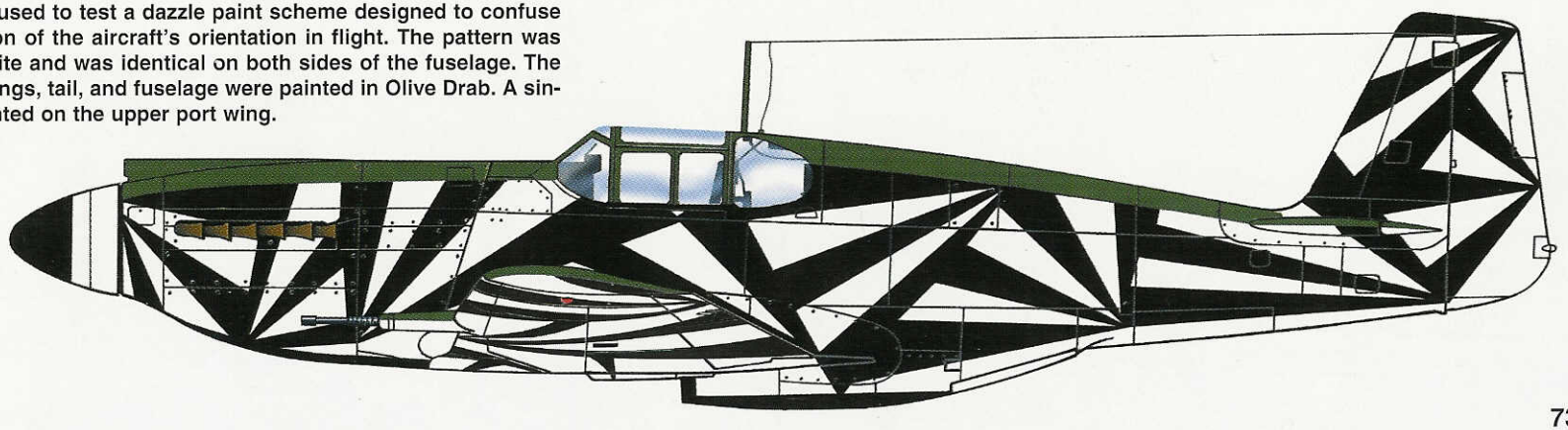
Mustang 1 (D/AG431) of an unidentified unit in the UK. AG431 is believed to have been painted with Mixed Grey, a substitute for Medium Sea Grey, on the upper surfaces. The paint could vary in tone despite precise mixing instructions. AG431 also has full span leading edge stripes and fishtail exhausts.





Mustang I (RZ~W/AG645) was assigned to 241 Sqdn, RAF. The aircraft wears the short-lived chordwise yellow identification bands used during the latter half of 1942. The left rear quarterlight has been painted over.

This P-51 Mustang was used to test a dazzle paint scheme designed to confuse an opponent's perception of the aircraft's orientation in flight. The pattern was painted in black and white and was identical on both sides of the fuselage. The upper surfaces of the wings, tail, and fuselage were painted in Olive Drab. A single US insignia was painted on the upper port wing.



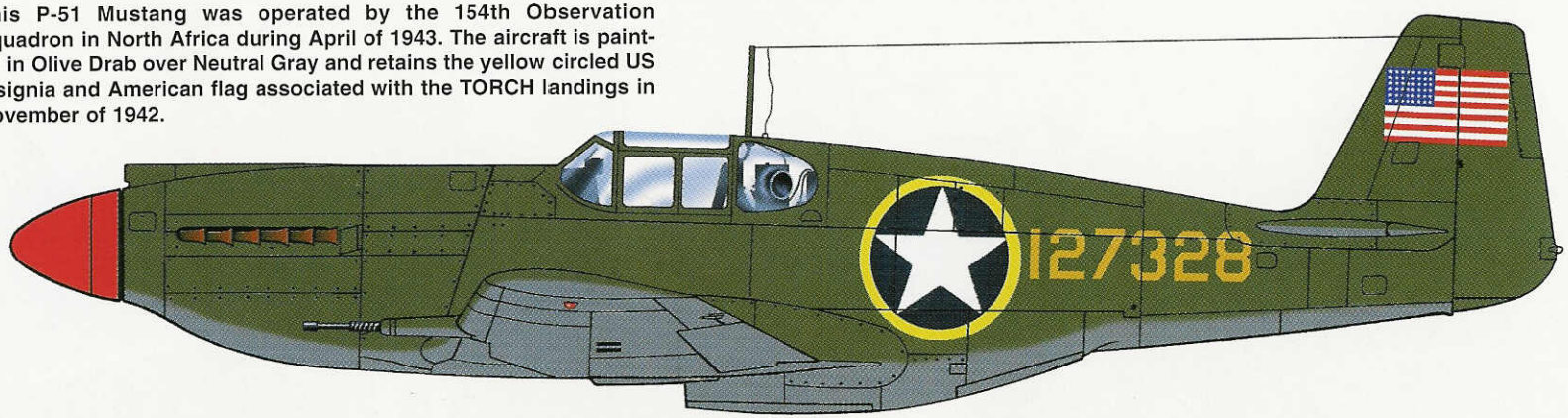
(Above) The P-51 replaced the RAF's Mustang I on the production lines and differed only in armament. The P-51 retained the slim-bladed propeller. Many early Mustangs eventually served in stateside training units. (USAFM)

(Below) "Slick Chick", a P-51A, was used for testing in the U.S. The aircraft is equipped with flared exhausts. Except for a small 'S' curve under the nose, the lower profile was a single gently curving line. (USAFM)

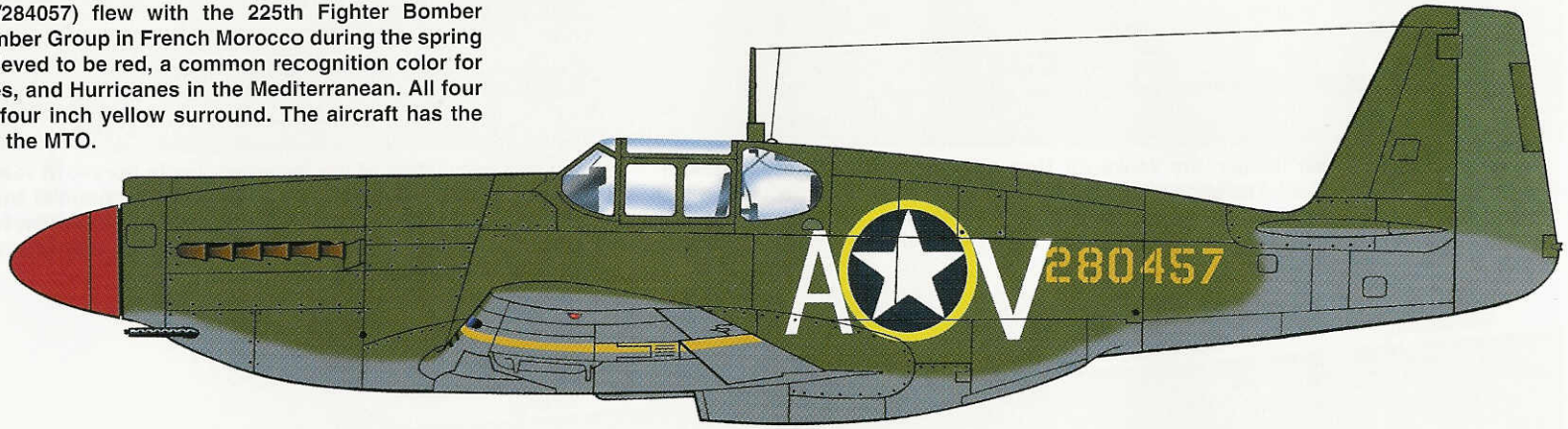
(Above) Rolled out of her hangar, the Yanks Air Museum P-51A basks in the Southern California sun for all to see. The serial number has changed in size and location and the insignia now has the white bars of late spring of 1943.

(Below) The installation of the Merlin engine in the P-51B resulted in a deeper nose and fuselage under the cockpit as well as radically altering the shape of the radiator ducting. By contrast, this gave the Merlin powered aircraft a beefier, heavier look. Nevertheless, the Allison powered Mustangs, even today, look every inch the slim thoroughbred that was the North American Mustang.

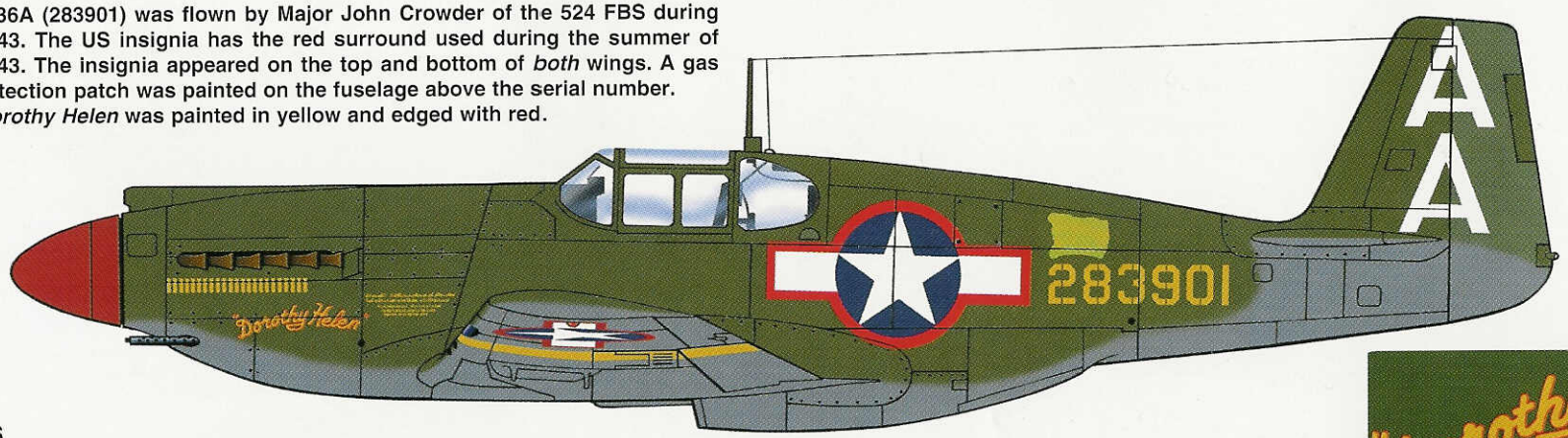
This P-51 Mustang was operated by the 154th Observation Squadron in North Africa during April of 1943. The aircraft is painted in Olive Drab over Neutral Gray and retains the yellow circled US insignia and American flag associated with the TORCH landings in November of 1942.



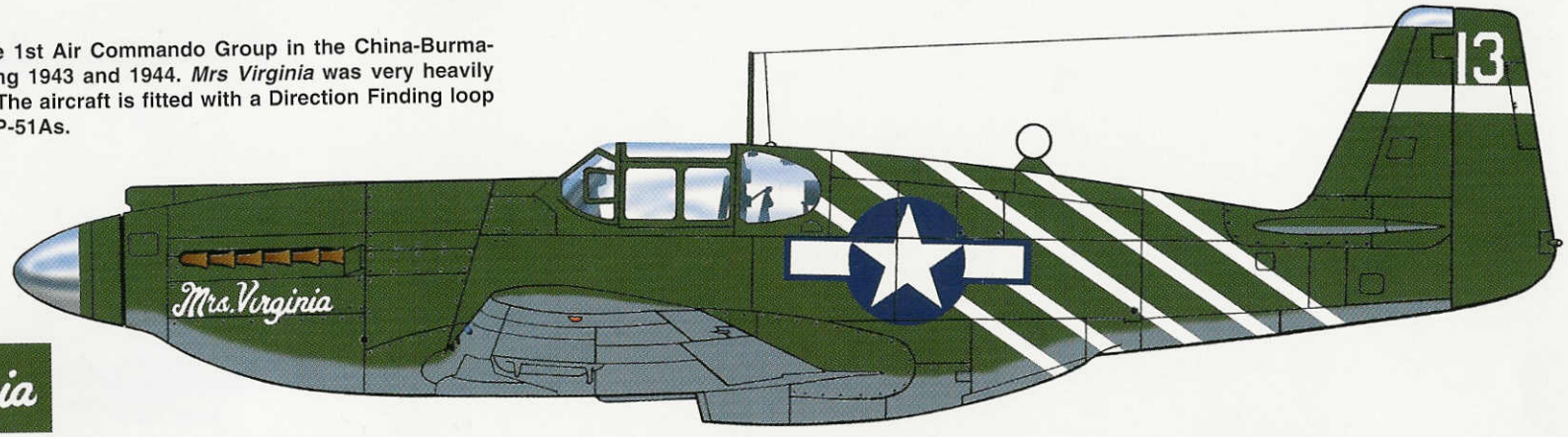
This A-36A Invader (A~V/284057) flew with the 225th Fighter Bomber Squadron, 27th Fighter Bomber Group in French Morocco during the spring of 1943. The spinner is believed to be red, a common recognition color for Allied P-40s, P-51s, Spitfires, and Hurricanes in the Mediterranean. All four national insignia have the four inch yellow surround. The aircraft has the antenna unique to A-36s in the MTO.



A-36A (283901) was flown by Major John Crowder of the 524 FBS during 1943. The US insignia has the red surround used during the summer of 1943. The insignia appeared on the top and bottom of *both* wings. A gas detection patch was painted on the fuselage above the serial number. *Dorothy Helen* was painted in yellow and edged with red.

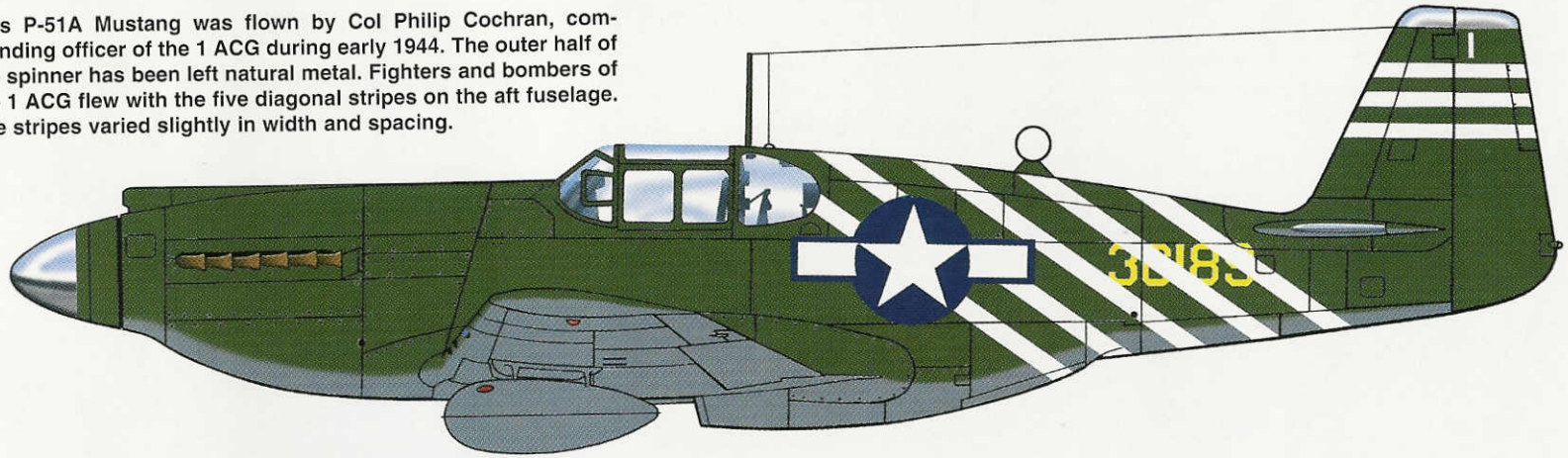


This P-51A flew with the 1st Air Commando Group in the China-Burma-India (CBI) Theater during 1943 and 1944. *Mrs Virginia* was very heavily stained and weathered. The aircraft is fitted with a Direction Finding loop common to all 1st ACG P-51As.

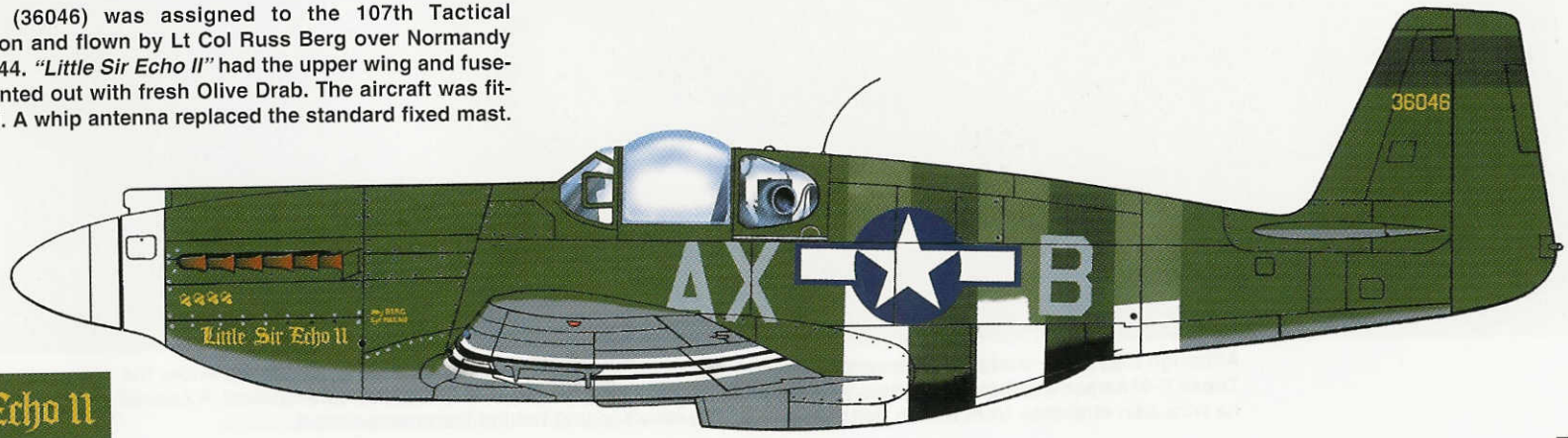


Mrs. Virginia

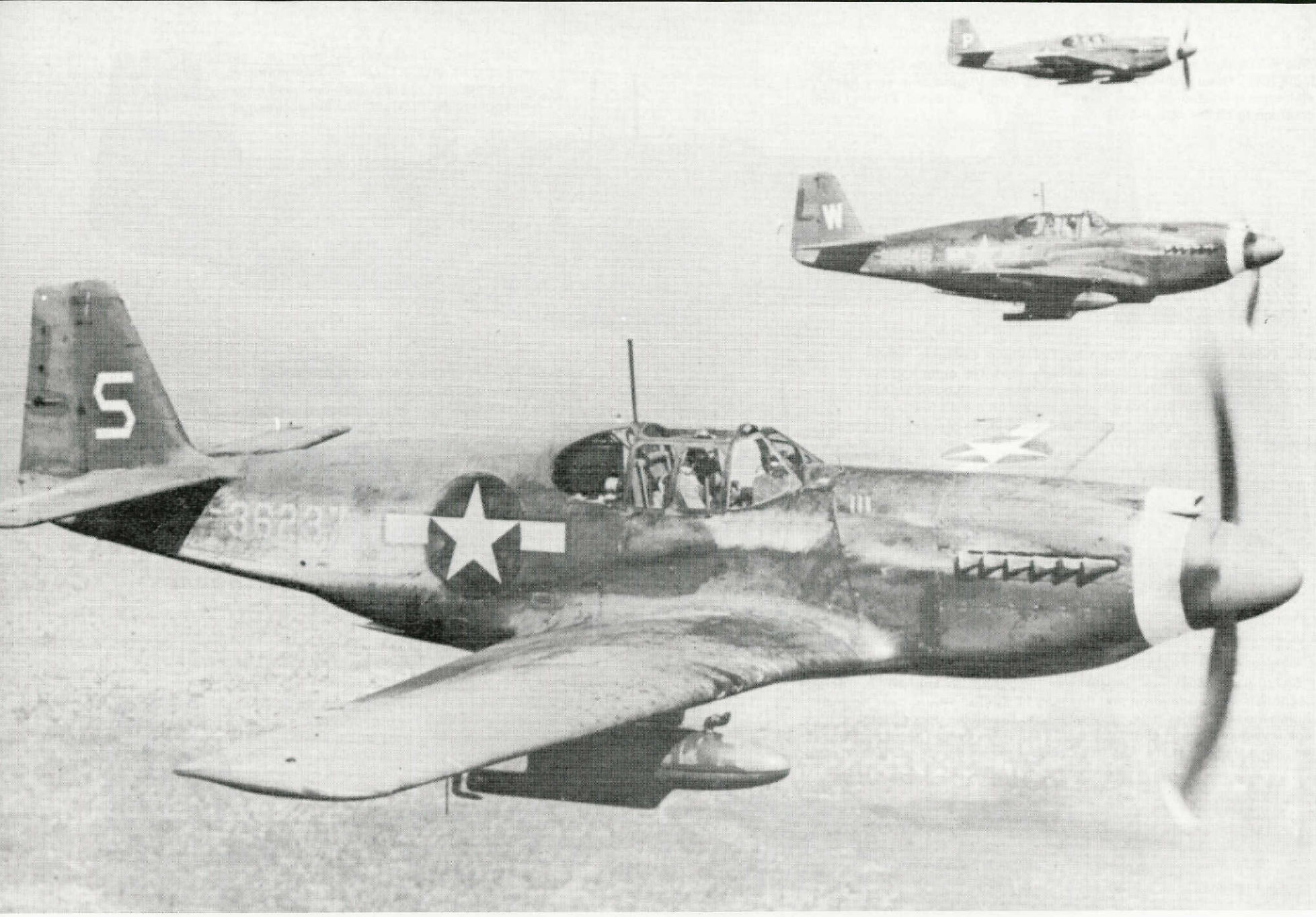
This P-51A Mustang was flown by Col Philip Cochran, commanding officer of the 1 ACG during early 1944. The outer half of the spinner has been left natural metal. Fighters and bombers of the 1 ACG flew with the five diagonal stripes on the aft fuselage. The stripes varied slightly in width and spacing.



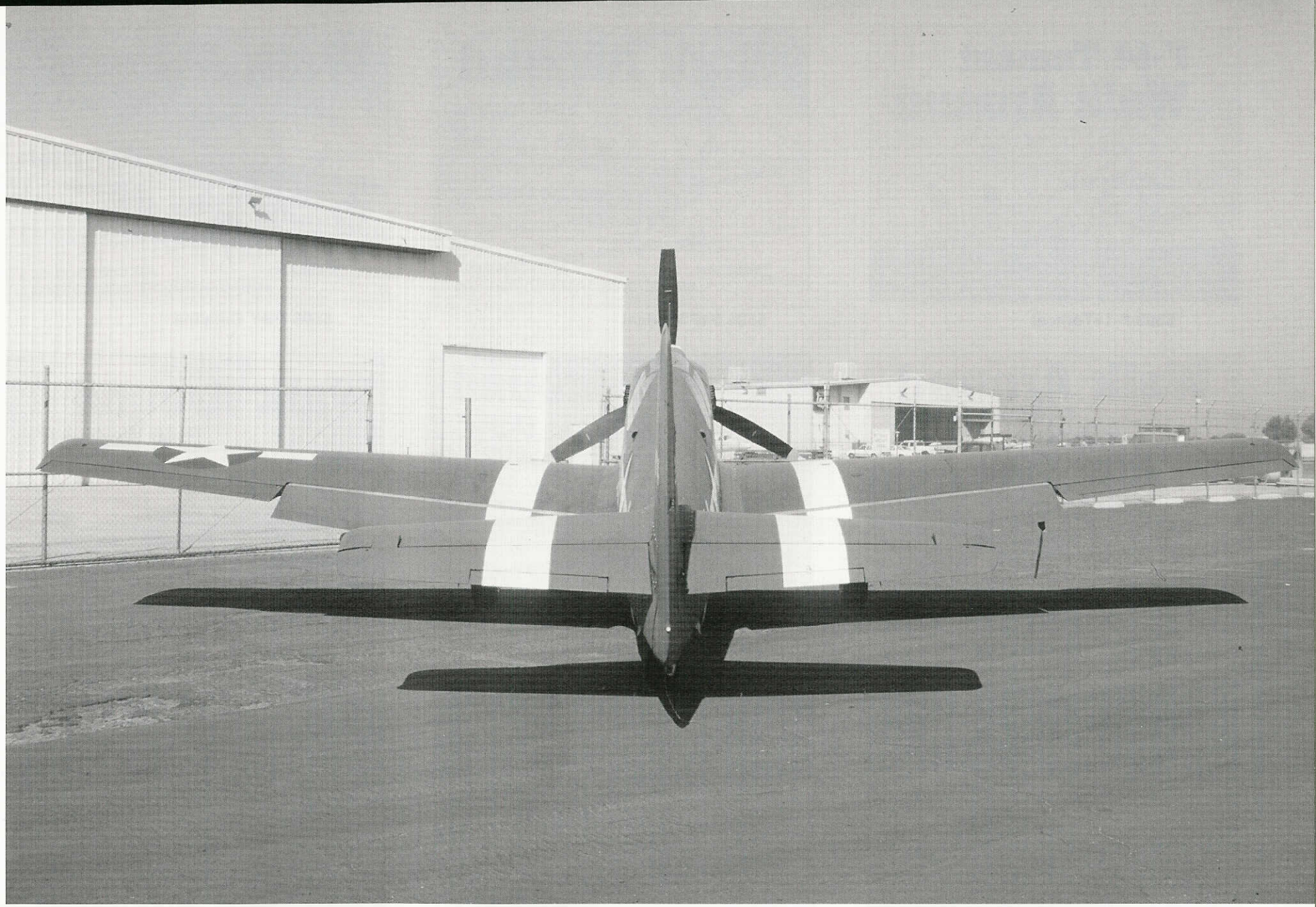
F-6A (P-51A) Mustang (36046) was assigned to the 107th Tactical Reconnaissance Squadron and flown by Lt Col Russ Berg over Normandy during the summer of 1944. *"Little Sir Echo II"* had the upper wing and fuselage invasion stripes painted out with fresh Olive Drab. The aircraft was fitted with a Malcolm Hood. A whip antenna replaced the standard fixed mast.



Little Sir Echo II



Although they were rarely used on operations, the A-36 and P-51A could carry chemical smoke tanks under the wings. These P-51As are weathered with heavy exhaust stains stretching back under the horizontal stabilizer. A second antenna wire also stretches from the fin tip to a point on the fuselage just behind the antenna mast.



Only lacking a sunset to ride off into, this Allison-powered Mustang represents a study in aerodynamic finesse. The Yanks Air Museum's P-51A retains the white bands used by the Allies to distinguish it from the Luftwaffe's Messerschmitt Bf 109.

5503 F-14Tomcat

5504 F4F Wildcat

5505 PBY Catalina

5506 B52 Stratofortress

5507 P-51D Mustang

5508 P-40 Warhawk

5509 F6F Hellcat

5510 Fw 190D

5511 P-47 Thunderbolt

ISBN 0-89747-386-8
90000>
9 780897 473866